

貢献: CREATING FUNCTIONAL HABITAT FOR AN
ECOREGION IN A JAPANESE-STYLE GARDEN

A CREATIVE PROJECT

SUBMITTED TO THE GRADUATE SCHOOL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE

MASTER OF LANDSCAPE ARCHITECTURE

BY

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MUNCIE, INDIANA

JULY 2019

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BALL STATE UNIVERSITY
MUNCIE, INDIANA
JULY 2019

ABSTRACT

Creative Project: 貢献: Creating functional habitat for an ecoregion in a Japanese-style garden

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Japanese gardens are popular throughout the world and usually include plant species native to Japan, regardless of where the gardens are installed. Plants used outside of their native region can become invasive, killing local flora, costing millions of dollars in remediation, and contributing little to the local ecosystem. Incorporating native plants in landscape architecture has become more common because of environmental concerns such as increased climate change; air, soil, and water pollution; the die-off of bees and other pollinators, and lack of natural habitat due to urban sprawl.

The purpose of this project is to design a Japanese-style garden in Columbus, Indiana, using only plants native to southern Indiana. The native plants used will be analogous in terms of form and habitat to over 200 of the most commonly used plants from Japanese gardens in Japan itself. A nine-acre site in Columbus was chosen for its ease of access, location near the interchange of a highway and interstate, and proximity to several Japanese-owned companies. In addition, Columbus is well-known for its many sites of architectural and landscape architectural interest. The addition of a large Japanese-style garden to the city would fit well within the history and culture of Columbus.



Source: Kyle Johnson.

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Source: Kyle Johnson.

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Source: Lisa Dunaway.

CHAPTER ONE: INTRODUCTION

The loss of native species from local eco-regions can cause loss of wildlife, an increase in soil erosion, air and water degradation, and contribute to the effects of climate change. Native plants contribute to their local ecosystems by providing food, shelter, and wildlife habitat. Other noteworthy characteristics of native plants are 1) their ability to resist diseases with which they have co-evolved, 2) they rarely spread and kill off other plants, and 3) some wildlife are extreme specialists, in particular, some insects, and have evolved to eat only one species of one genus of plant. The loss of even a few plant or wildlife species can result in the collapse of an eco-system and the loss of ecosystem services.

Traditionally, landscape architects and landscape designers have ignored the importance of native plants in the landscape. Native plants were seen as dull, common, and pedestrian. It was a sign of wealth and culture to import plants from other parts of the world. Native plants were also mistakenly assumed to be less aesthetic than non-native species. Even now, there is still a lack of education amongst the landscape architectural community about the importance of native plants, although things are improving. Arguably, the profession is now at the beginning of an "epochal shift away from a top-down, monocultural program for infrastructure and the environment and toward a collaborative, community-stewardship-driven methodology that acknowledges change and uncertainty" (Orff, 2016, p. Introduction). There is now a "growing consensus about what we do not want from the environment: soil erosion, habitat loss, ecosystem fragmentation, species extinction, atmospheric and aquatic pollution, climate change, diminished quantity and quality of food and water" (Murphy, 2005).

This Japanese-style garden would be designed to appear like any traditional garden in Japan but using only plants native to southern Indiana. This garden would be an opportunity to not only create a landscape that is beautiful, but to restore an abundance of native plants to the

local ecosystem, bolster the biodiversity of the area, and educate visitors on the importance of native plants.

Goals & Objectives

- The garden will be a functional addition to the local ecosystem
 - By the use of plants native to southern Indiana
- Using locally-sourced materials when possible
- The garden will serve as a passive educational tool for visitors
 - Through the use of native plants
 - Through signage placed throughout the garden
- The garden will be aesthetically similar to Japanese gardens of the Edo (江戸時代) period
- Garden elements found in the case studies from Japan will be used as models, e.g. ponds, directed views, dry gardens, etc.

Delimitations

- This project will not be a definitive guide to either native plants or Japanese-style gardens. The majority of the work will be the design and visioning of the garden, and selection of plant material.
- Minimal information about maintenance will be given.
- No information about liability will be given.
- The religious aspects of Japanese gardens will not be considered.
- Active education theories and techniques will not be considered.
- Educational signage will not be designed.
- Modern Japanese-style gardens will not be considered.
- On-site buildings will be generally designed to fit the aesthetic intentions of the project but will not be designed in detail.

Methods

Methods to research, design and complete this project will be the assessment of relevant case studies in Columbus, Indiana, the United States, and Japan such as the Portland Japanese Garden and Nijo Castle in Kyoto. Pertinent literature in both the topics of native plants and Japanese gardens will be reviewed. Documentation and assessment of commonly used Japanese garden plants and their native counterparts will also be included. Finally, a garden that applies and demonstrates the principles learned will be designed along with supporting design documents and 3-D visualizations.

Site Location

Columbus, Indiana, is the county seat of Bartholomew County, in the United States. It is a small city 35 miles south of Indianapolis and 60 miles north of Louisville, Kentucky. The 2017 estimated population was 47,143, making it the 20th largest city in Indiana (United State Census Bureau, n.d.).

Architectural History

The American Institute of Architects has consistently ranked Columbus as the sixth most architecturally important city in the United States, after cities like Chicago, New York, and Washington, DC (Vinnitskaya, 2012). "Today, Columbus has more than 70 buildings designed by internationally renowned architects – including I.M. Pei, Eliel Saarinen, Eero Saarinen, Richard Meier, and Harry Weese" (Vinnitskaya, 2012) and also features works from notable landscape architects such as Dan Kiley. Because of its design history, Columbus is an ideal location for a Japanese-style garden, as proposed here.

Cultural Links

Japanese companies are established in a variety of Indiana cities, such as Noblesville and Shelbyville, but the number one source of Columbus' foreign investment is Japan, with 27

companies located there (Greater Columbus Indiana Economic Development, n.d.). Other countries have such as Germany, China, and India do business in Columbus but none have the same impact as Japan (Greater Columbus Indiana Economic Development, n.d.) Since so many Japanese companies and citizens live and work in Columbus, the city is an excellent candidate for this project.



Source: Kyle Johnson.

CHAPTER TWO: SITE INVENTORY & ANALYSIS

This project site is just southwest of the Hoosier National Forest and Brown County State Park (see Image 1). This makes the community part of a large area of continuous forest crucial to the ecological health and biodiversity of the Midwest. These forests provide a home for many rare, threatened, and endangered species of plants, animals, and other biota, and allow for countless species, both common and rare, to migrate safely. But the natural beauty of the land and its environmental importance does not stop with state parks and nature preserves. The abundance of high-quality natural resources is one of the reasons people have been drawn to this area of Indiana, and it is why they remain there today. While these natural resources are cherished, they can also be taken for granted, resulting in significant consequences for the environment and economy. Maintaining biodiversity is essential for human, environmental, and economic health.

The site for the project, at 4300 W Goeller Boulevard in Columbus, is in Bartholomew County, Indiana. It is well-connected to downtown Columbus via State Road 46, a bus route, and a continuous sidewalk that runs under Interstate 65 (see Image 2). The site itself slopes down from the northwest to the southeastern corner and would be accessed at the median divide on Goeller Road (see Image 3).

Recently, the site owned by a local church, zoned as an agriculture zone, and was available for purchase. The site is approximately nine acres and bordered on all four sides by residential zones (see Image 4 through Image 13). It was recently purchased and re-zoned as a multi-family zone. In such a zone, a Japanese-style garden would be allowed as a conditional use if considered a park or allowed as a permitted use if judged to be a nature conservation or nature preserve. (Hughes, 2019)

Site Location

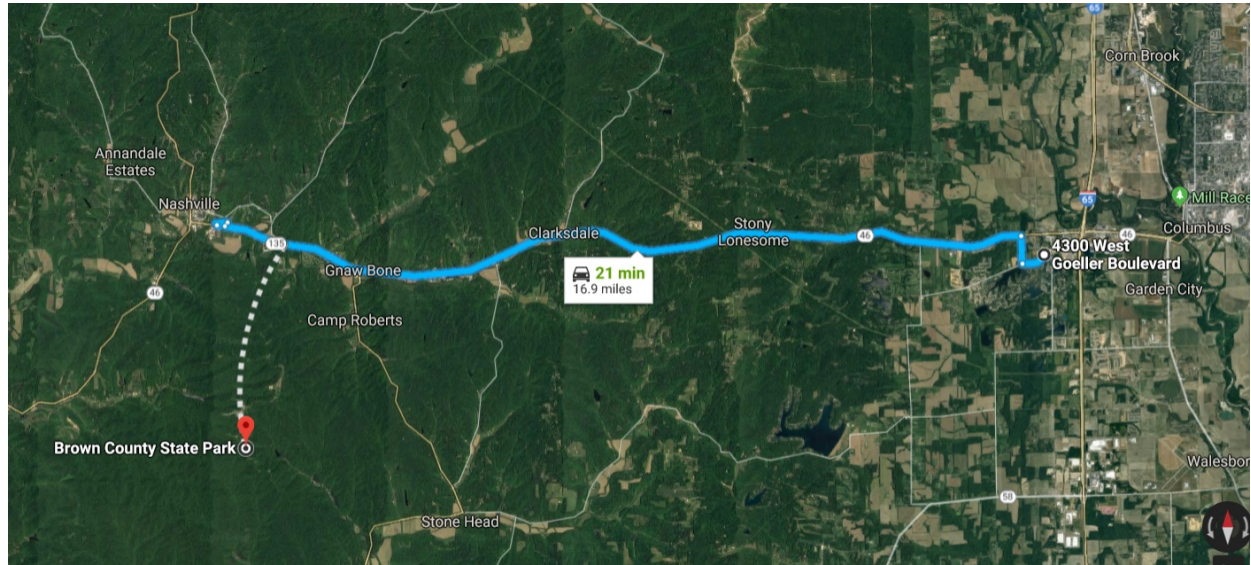


Image 1 - Site proximity to Brown County State Park. Source: Google Maps.

Site Analysis: Neighborhood View

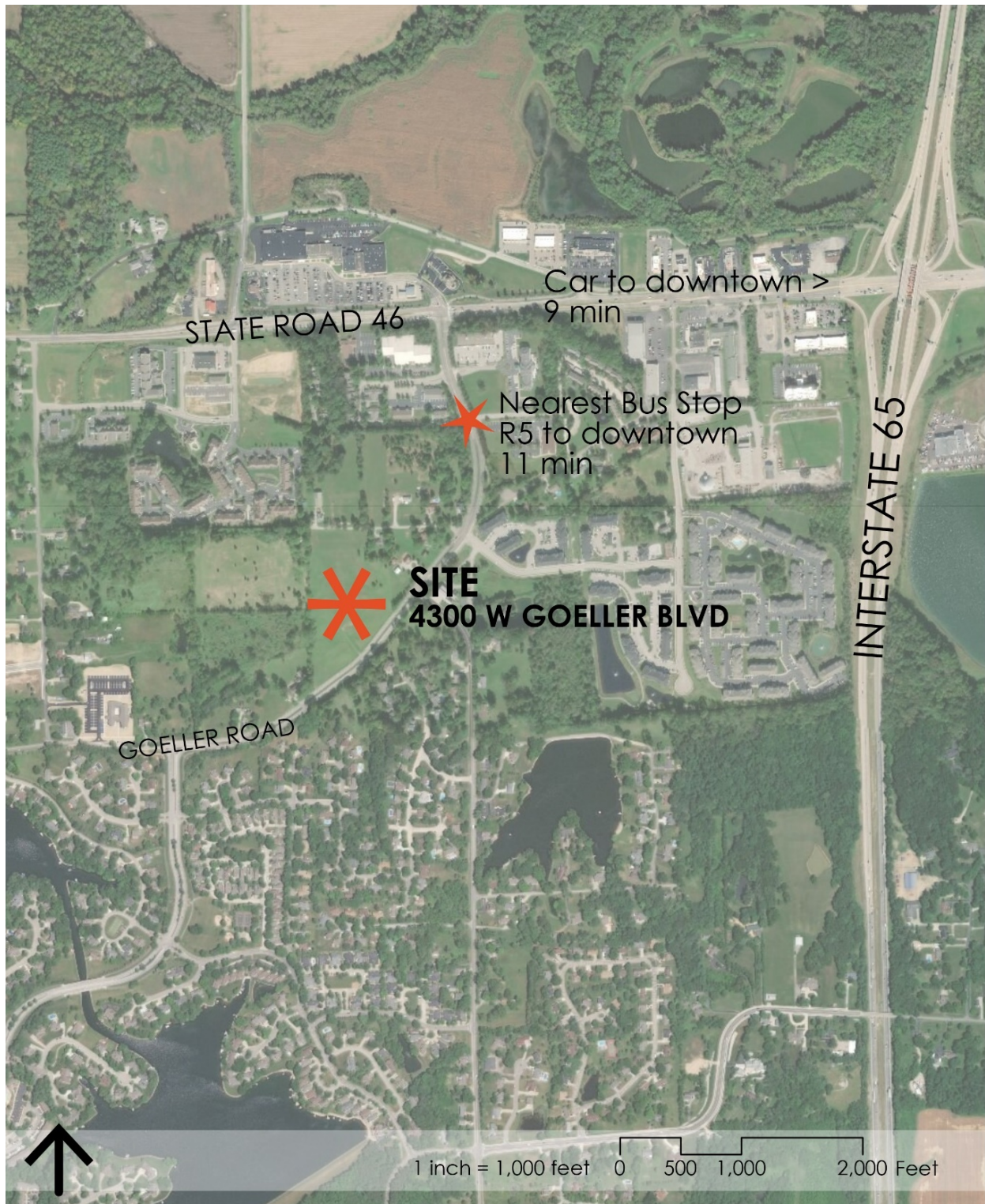


Image 2 - Site location and connectivity. Source: Lisa Dunaway via ArcMap.

Site Analysis: Site View

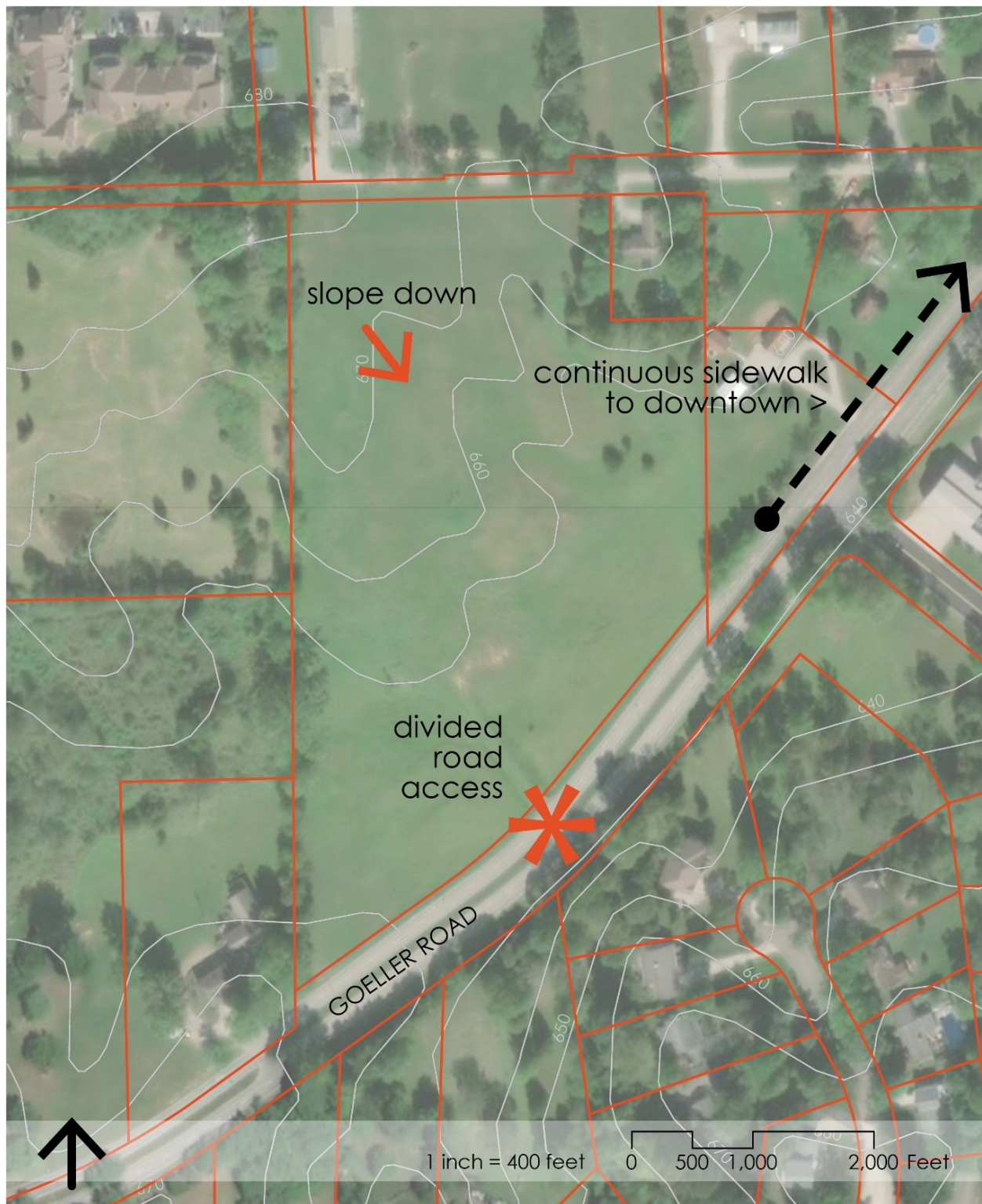


Image 3 - Site analysis. Source: Lisa Dunaway via ArcMap.

Site Photos



Image 4 - Goeller Boulevard entrance looking east-northeast. Source: Stephen Hughes.



Image 5 - Goeller Boulevard entrance looking east. Source: Stephen Hughes.



Image 6 - Goeller Boulevard entrance looking north. Source: Stephen Hughes.



Image 7 - Eastern property line near Goeller Boulevard entrance looking north. Source: Stephen Hughes.



Image 8 - Center of the site looking north towards small mound. Source: Stephen Hughes.



Image 9 - Eastern property line near Goeller Boulevard entrance looking west. Source: Stephen Hughes.



Image 10 - On the western side of the mound at the northwest corner of the property.
Source: Stephen Hughes.



Image 11 - On the top of the mound at the northwest corner of the property looking south.
Source: Stephen Hughes.



Image 12 - On the top of the mound at the northwest corner of the property looking south.
Source: Stephen Hughes.



Image 13 - On the top of the mound at the northwest corner of the property looking west.
Source: Stephen Hughes.



Source: Kyle Johnson.

CHAPTER THREE: NATIVE PLANTS

Introduction

Indiana has a rich natural heritage. The habitats that occupy Indiana have been changing ever since the retreat of the glaciers over 13,000 years ago. Prior to European settlement, Indiana was mostly deciduous forest, wetlands, and grasslands. Unfortunately, many of these ecosystems are a mere pittance of their original vastness. Agriculture, industry, and urban development now dominate the Indiana landscape. Many threats still exist for remaining natural communities. Land planning and development can incorporate restoration and management of natural communities which ensure future generations will have an appreciation and value for Indiana's native habitats and the organisms that depend on them.

Overview of native plants

The loss of biodiversity is arguably the greatest threat to ecological and economic sustainability in our time. Whether the goal is to protect and enrich biodiversity for the sake of the environment or to protect our human way of life, the steps to take are the same. Humanity cannot exist without our native biodiversity intact. The loss of every species from the smallest fungi to the largest mammal impacts the natural systems within which humans live and from which we obtain every resource necessary for our existence.

Regardless of the causes of biodiversity loss, which are numerous and varied, humans can make a profound difference in reversing those losses with practical, cost-effective measures implemented throughout the landscape at any scale. This means that every effort from an individual's backyard to our national parks and beyond is a contribution, and therefore, we must plan for biodiversity at every scale. Humans cannot separate our footprints from the ecological systems around us: We must manage the landscape to maintain biodiversity. We impact the landscape and it impacts us.

Explanation of native plants and their function in the ecosystem

Established ecosystems have developed their own natural balance and controls over time, and the plants and animals within those systems have adapted to survive within those conditions.

Native plants are those which grow naturally in Indiana, such as Redbud trees (*Cercis canadensis*) or Black-eyed Susan (*Rudbeckia hirta*). When non-native species from other ecosystems are introduced, they can upset the natural balance and can harm the established plants, animals, and the entire ecosystem. Non-native species come from elsewhere and are not natural to the ecosystem they have been introduced to, such as Bush Honeysuckle (*Lonicera maackii*) or Periwinkle (*Vinca minor*). They may be harmless and beneficial in their natural surroundings, but they can completely devastate different environments. When non-native, exotic, or alien species enter into an ecosystem, they can disrupt the natural balance, reduce biodiversity, degrade habitats, alter genetic diversity, transmit exotic diseases to native species, and further jeopardize endangered plants and animals. When there are no established natural controls, such as predators to keep the non-native harmful species in check, there can be a population explosion of the invasive non-native species causing an ecological catastrophe.

A similar threat to biodiversity is invasive species. Invasive species can be native or non-native, but are overly aggressive and can wipe out native populations quickly. These species may be as harmless looking as a vine or a frog. They don't have to be vicious looking to bring harm to an area. They may even be beautiful to look at, which is why humans have commonly imported exotic and invasive species into landscapes in which they did not evolve.

Many humans want to design their own ecosystems to fit their desires. They bring in ornamental flowering trees, nonnative fish, specialty seeds, and unusual animals. This can wreak havoc on the natural species and the established habitat. Ornamental exotic plants, flowers, and trees, or animals that are brought into an ecosystem may increase the number of species locally; but when the introduced species take over, they will crowd-out or kill the native indigenous species,

such as Kudzu or クズ (*Pueraria montana* var. *lobata*) has in the southern United States or Bush Honeysuckle (*Diervilla* spp.) has in much of the eastern United States. In some cases, this causes extinctions of particular species of plants and animals, which have serious environmental, economic, and aesthetic consequences. The extinction of native plants, in particular, has drastic consequences for local ecosystems because plants are usually the base of food webs, and when plants disappear, insects, amphibians, mammals, and other living creatures have no food source, and so the negative effects spread across the native biota.

Entomologist Dr. Douglas Tallamy points out that although an alien species may not yet have escaped human captivity to wreak havoc on the native landscape, it could at any time (Tallamy, 2007, p. 85). It is crucial to eliminate the chance that non-native species can escape by never using them or introducing them into the landscape. If they are used, our native species can become extinct, and the biodiversity of our planet will be further reduced. An example in Indiana is the Emerald Ash Borer, an insect that was introduced to North America in the 1990s, which is quickly killing off native Ash trees (*Fraxinus* spp.). The Ash Borer has caused devastating losses to the local landscape and economy through the loss of street trees alone. The Japanese-style garden proposed here could help to promote local biodiversity by using only native species and by removing invasive or exotic species found on-site, which is discussed in the next subsection. A list of species recommended for removal is located here:

<http://inpaws.org/IPSAWG%20brochure.pdf>. However, those species on the aforementioned list that are classified as "Plant with Caution" are considered by this author to also be a threat to biodiversity and should not be utilized in the landscape under any circumstances.

Native plants are used to the conditions in Indiana and therefore do not need fertilizer or a lot of water. Planting nonnative plants that need fertilizer and extra water can increase the potential for higher runoff volumes, increase erosion, cost more in long-term maintenance, introduce chemicals into stormwater, and severely reduce local biodiversity. In contrast, native

landscaping allows homeowners to reduce their pollution. Other more appropriate landscaping techniques include: using native soils, small turf areas, proper irrigation, using mulch, and keeping the landscaping maintained. By using native plants that are well-suited to a region's climate and pests, property owners drastically reduce their need for irrigation and chemical pollutants. Less irrigation results in less runoff, while fewer chemicals keep runoff clean. A list of native plant species recommended for use in the landscape is located here:

http://inpaws.org/Landscaping_1.pdf. A list of native plant providers within Indiana can be found here: <http://inpaws.org/IndianaPlants.htm>.

The human effect on native ecology does not need to be harmful for us to live happily. We can choose to manage the environment in ways which benefit both us and the natural systems around us.

Native fauna and natural communities

Rare, Threatened, and Endangered Species

Many species of biota that are rare, threatened, or endangered are in peril because of habitat loss or degradation. Roads, housing communities, industrial parks, and all other types of human development remove both habitat and the natural corridors through which biota migrate, such as streams, riverbanks, and even hedgerows (see Image 14). Snakes, for example, have declined mainly because of drainage "improvements," filling of their lowland swamp habitat, and clearing of adjacent upland woods where they spend the winter (i.e. hibernation sites). Other species of wildlife such as the Bobcat (*Lynx rufus*), are frequently killed when crossing roadways or by dependence on polluted water systems.

The preservation of existing habitat and wildlife corridors and the continued restoration of the same will help species in peril once again thrive. Endangered Species Act grants have funded habitat management on private lands in Indiana. Other sources of grants and financial assistance can be found by contacting the Indiana Wildlife Federation, the Natural Resources Conservation Service, the Indiana Department of Natural Resources, and the Central Indiana Land Trust.

Southeastern Indiana is home to rare, endangered, and threatened species such as the Red-shouldered Hawk (*Buteo lineatus*), Indiana Bat (*Myotis sodalis*), and American Badger (*Taxidea taxus*), which are excellent examples of what ecologists commonly refer to as *charismatic megafauna* (Indiana DNR, 2018). These are species that are showy and beloved and therefore more likely to get people interested in their conservation.

High-quality natural communities in Bartholomew

County include the Bluegrass Till Plain Flatwoods, Highland Rim Dry Upland Forest, Bluegrass Dry-mesic Upland Forest, Highland Rim Dry-mesic Upland Forest, Bluegrass Mesic Upland Forest, Limestone Cliff, and Gravel Wash (Indiana DNR, 2018). A complete list of the rare, threatened, and endangered species of Bartholomew County can be found at http://www.in.gov/dnr/naturepreserve/files/np_bartholomew.pdf.

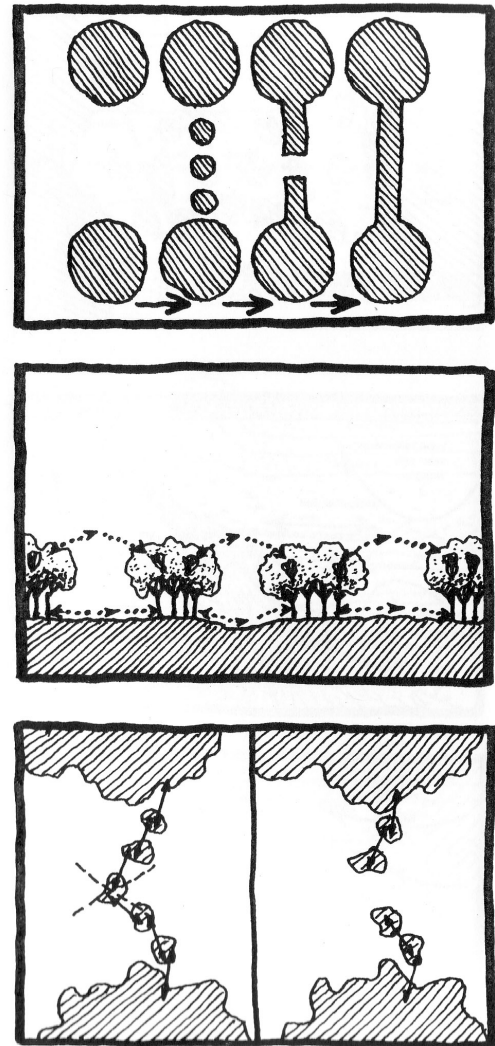


Image 14 - Restoration of wildlife corridors through the planting of native vegetation (top), Wildlife movement between areas of habitat (middle), The elimination of areas of habitat prevents migration (bottom) (Dramstad, Olson, & Forman, 1996, p. 37).

When natural communities can be protected from unsustainable forestry practices and over-development, these species and natural communities stand a better chance of survival.

Similarly, when a cleared site such as 4300 W Goeller Boulevard can be developed with native plants, the site can be helpful for bringing back habitat in the local ecoregion.

Wildlife-Friendly Habitat

The creation of wildlife-friendly habitat contributes to regional biodiversity by adding to the number of native plant species and allowing mammal, insects, and other wildlife to utilize those plants as a resource. The following information is provided in part by the Indiana Wildlife Federation (Indiana Wildlife Federation, 2019).

Basic needs for a wildlife habitat

Food

Any given area of habitat is a mini-ecosystem with multiple food chains. Landowners and managers should supply as much food as possible through native vegetation in order to meet the year-round needs of a variety of species. Trees, shrubs, herbaceous plants, succulents, and even grasses produce foods such as acorns and other nuts, berries, fruits, and seeds. Buds, catkins, foliage, twigs, sap, nectar, and pollen are all other important wildlife food produced by plants.

Native tree species of particular importance as a food source are Oak trees (*Quercus spp.*), Willows (*Salix spp.*), and Black Cherries (*Prunus serotina*). Oaks, in particular, provide a food source to a greater number of wildlife species than any other tree (Tallamy, 2007). Other beneficial trees include, but are not limited to, Poplars (*Populus spp.*), Birches (*Betula spp.*), Crabapples (*Malus spp.*), and Maples (*Acer spp.*) Native shrubs that are especially important for

wildlife include Dogwoods (*Cornus spp.*), Viburnums (*Viburnum spp.*), Hackberries (*Celtis spp.*), and Blueberries (*Vaccinium spp.*).

Fortunately for humans, all these plant species are aesthetically pleasing, inexpensive compared to their exotic and imported counterparts, low maintenance, and native to Indiana. More information about these species can be found in the Appendix.

Water

Like food, every living thing needs clean water, for drinking, bathing, and sometimes breathing. Nature provides water to wildlife in a multitude of ways that can be replicated in human-made habitat. The amount of water that can be provided depends upon how much space is available and the financial resources able to be utilized. Water can be provided in something as simple as a shallow dish, like the drainage pan of a flower pot or the classic bird bath. Larger installations such as stormwater retention ponds, constructed wetlands, and rain gardens can provide water for a large number of species. Having various forms of water within a site helps to ensure the greatest number of species can be supported. An elevated birdbath is fine for flying and climbing animals, but creatures like toads, rabbits, and turtles will need water provided on the ground in rain gardens, ponds, or wetlands to meet their needs. Almost all species of biota need clean water in order to survive. Water quality can be protected by minimizing the use of lawn chemicals (e.g. fertilizers, herbicides, and insecticides), recycling used car oil, and properly disposing of paint and other toxic household products (EPA, 2018).

Cover

Wildlife needs protective cover just as people need the shelter of buildings, both as protection from predators and extreme weather. Plants again play an important role in creating this component of habitat. The same plants that provide food will do double-duty as cover. Native evergreens can provide excellent cover throughout the year.

Densely branched shrubbery like Dogwoods (*Cornus spp.*) can provide cover even if the plants are not evergreen and thorns on shrubs such as Hackberries (*Celtis spp.*) add other elements of protection. Meadow and prairie areas also provide cover for a multitude of species. A list of meadow and prairie species appropriate to plant in the Indiana landscape is available at spencenursery.com/plant_communities.

A species under threat in southern Indiana is the Indiana Bat (*Myotis sodalis*) (see Image 15). Bat boxes provide excellent housing for bats whose natural cover has been removed. It should be noted that bats prefer boxes located on the side of buildings or attached to poles as opposed to boxes placed in trees because predators have easier access to the boxes in trees. A variety of wooden boxes designed to house wildlife can be built or purchased. Roosting boxes will be used at various times throughout the year by many species of birds and mammals, like squirrels.



Image 15 - The Indiana Bat. Source: <http://endangered.nothingbut830.com>

However, some people find particular native species, such as the Canada Goose (*Branta canadensis*) to be a nuisance (see Image 16). These birds are not a threatened or rare species; however, they are native and important to the local biodiversity. Their diet consists largely of insects; therefore, they help keep the insect population in check, much like bats and other species of native birds. Canada geese present a problem to humans because we typically place stormwater ponds near roadways, and therefore the geese must cross roads to go from one pond to another. These birds love turf grass, and turf grass is often planted beside roadways and around ponds. The best way to keep geese out of an area is to grow native, tall grasses

around the perimeter of ponds. The grasses act as a deterrent to the birds and help filter pollutants out of the stormwater runoff and control erosion.



Image 16 - The Canada Goose.
Source: Wikimedia Commons.

A place to raise young

Places to raise young are essential to successful wildlife habitat. These are places where wildlife can engage in their courtship behaviors and where they can safely nurture and raise their young. Without this unique type of cover, wildlife may pass through your habitat area to utilize food, water, and cover resources you've provided, but will not be able to take up a truly permanent residence in all stages of their life cycles.

Brush piles, mature trees, ponds, tall grasses, and dense shrubbery will all be used by some species as places to raise young as well as for cover. Dead or dormant plants, such as dead tree snags or dormant meadow and prairie plants are also great places for wildlife to raise their young. Bird nesting houses for native species provides a place for birds to nest and raise their young. Many species of insects and amphibians require standing bodies of water to lay their eggs. Tadpoles are fully aquatic for the first stage of their lives, as are dragonflies, and other amphibians and insects. Therefore, measures that provide food, water, and cover are often also useful as places to raise young for many species of wildlife.

Planting Methods

Establishing native plant communities in the landscape can be a challenge, particularly in areas where invasive and exotic plant species are already thriving. It is important that contractors and property owners learn the proper planting techniques for the species which they are planting in order to improve the chances of survival. Some types of plants that would be appropriate to

establish in this site are species found in upland forests, dry-mesic upland forests, limestone cliffs, and gravel washes. Luckily, these natural communities are very similar in terms of species and aesthetics to typical Japanese gardens, as will be described in the next section, Japanese Gardens.

Turfgrass or lawns are typical in the American landscape but are not native to any part of the United States. Lawns require intense maintenance such as watering, trimming, and chemical fertilization. They are also typically made up of one species of grass, also called a "monoculture," which is the opposite of biodiversity. By reducing the amount of lawn in this project, the site can greatly reduce the harmful environmental effects a lawn has on stormwater runoff and help to bolster the local biodiversity. Lawns will be used only in the places most typical of Japanese gardens, such as the entry, and other areas of the site will be covered with crushed stone or gravel. This project can help lead the way towards an understanding of Japanese culture that is also low maintenance and rich in biodiversity.

Preservation & Maintenance Plan

Preservation of existing native species and pre-development conditions

During construction, it is important that all members of the construction team be familiar with this preservation plan. The existing vegetation, although it may be removed in the future, should be protected during construction with protective fencing placed well outside the drip-line of any trees and shrubs. Exceptions to this rule include any invasive or exotic species of vegetation found on the site, as discussed previously in this document. Removal during construction of these aggressive spreading exotic plants may be the easiest and least costly method.

Other methods of minimizing disturbance during construction include using the least amount of heavy equipment necessary for construction, removal of only that soil which is essential for building and roadway construction, and stockpiling of that soil for reusing later on-site. Many other methods of sustainable construction exist and should be utilized where possible. More

information can be found at <http://www.sustainablesites.org/>. Protecting soils from disturbance is invaluable for preventing erosion and maintaining the nutrient levels within the soil. Soil that is eroded and/or devoid of nutrients cannot support plant life, and therefore cannot support insects, birds, mammals, or other species that contribute to biodiversity.

On-going site maintenance

Trees, shrubs, grasses, and most other types of vegetation provide both habitat and food sources for native species of wildlife and should be preserved or restored when possible. However, protecting the vegetation on site does not mean that vegetation should never be removed from a site. In fact, many species of plants, like alien and invasive species, should be removed in order to preserve the overall biodiversity of an ecoregion, as previously discussed.

When vegetation is removed, it mimics the natural process of disturbance. Natural disturbances include earthquakes, tornados, and fire, and are vital to maintaining the overall health of an ecosystem. However, these disturbances present a threat to human health, so human techniques should be employed. By physically removing native vegetation after it has reached maturity, humans can safely imitate the disturbances that are so vital to the local ecosystem. Examples of the best trees to plant for bolstering biodiversity are fully-grown Oaks (*Quercus spp.*), Maples (*Acer spp.*), and Black Cherries (*Prunus serotina*).

These species of trees can be dried and used for firewood or fencing after removal. Removal methods should have minimal impact on the landscape, including the avoidance of heavy machinery and chemical applications where possible. Consultation with a professional forester, certified arborist, or horticulturalist is strongly recommended to ensure that the vegetation is removed at the proper age and time and that invasive species are disposed of correctly. Invasive and exotic species can reestablish over time, and the forest canopy is continually growing and maturing. Therefore, it is important that the maintenance of the on-site vegetation be carried on into perpetuity.



Source: Lisa Dunaway.

CHAPTER FOUR: JAPANESE GARDENS

Introduction

The Japanese believe that happiness and suffering are inextricably bound with nature, for example, waterfalls and flowers bring beauty and serenity whereas typhoons cause destruction and death. Therefore, Japanese dedication to gardens is a manifestation of their respect and fear of nature, or a “distillation of cultural values” (Nishiyama, 2014).

Physical form

Japanese gardens (*Nihon teien* or 日本庭園) are thought to have originated around the seventh century as sacred places built for religious practices based on Chinese gardens of similar purpose (Nishiyama, 2014). The physical forms and elements in the gardens were meant to represent aspects of the natural world such as oceans, mountains, hills, and rivers (Nishiyama, 2014) in smaller, abstract forms. For example, a large boulder in a bed of raked, crushed gravel could symbolize one of the islands of Japan in the midst of currents in the sea (see Image 17). This representative technique was

especially popular in inland cities like Kyoto where it helped to bring the idea of islands in the ocean into the middle of the country (Nishiyama, 2014).



Image 17 - A dry garden with boulders and raked gravel. Source: Instagram.

Types of Japanese gardens (*teien*) included strolling or pond gardens, with the water representing the ocean; dry gardens (*karesansui*), devoid of water but where stone, moss, and gravel characterize water; and tea gardens, typically secluded and secretive, signified mountain retreats deep in the forest. Primary elements in most Japanese gardens are stone, water, and trees. Stones are used in their natural form to evoke a waterfall, shore, or island. Water is a direct allegory for oceans and rivers. Trees directly represent forests and mountains. (Nishiyama, 2014) Textures are more important than color, so shrubs and flowering plants are not typically the focal points and mass plantings are not as common as they are in the gardens of western traditions.

Idealized order is exemplified in Japanese gardens: for example, the perfect cyclical nature of the water cycle. It is also common for famous waterfalls to be recreated at smaller scales with the waterfalls at the base of Mount Fuji, Shiraito and Otodome Falls, being very commonly recreated sites (see Image 18).

Also common was the technique of “borrowed scenery” (*shakkei*) (Goto & Naka, 2016), where elements behind focal points gave the illusion that the landscape expanded far beyond the



Image 18 - Otodome Falls / Otodomenotaki.
Source: Wikimedia Commons.

area where the visitor was standing. For example, a far-off landmark such as a mountain top could be framed by elements within the *teien* to give the impression that the garden extended from the viewer all the way to the mountain (see Image 19). These methods made vistas seem more expansive and therefore the *teien* would feel much larger and be more aesthetically pleasing. (Nishiyama, 2014) More examples of borrowed scenery are found in the case studies described later in this document.

A Brief History

Strolling or pond gardens were especially popular 1,000 years ago. Aristocrats and the emperor had them for ceremonies of state and recreation but also to have drinking parties, paddle a boat around on, and to contemplate while writing poetry (Nishiyama, 2014), which was considered to be one of the most prestigious pastimes of the male aristocracy (Meyer, 2014). It was not easy to travel around Japan in the past, so the aristocracy traveled by proxy by recreating scenes in their private *teien* (Nishiyama, 2014).

Strolling gardens were in vogue in the seventh and eighth centuries. These gardens had views that come in and out as the visitor moved throughout the *teien*.

In the 17th century, lords or *daimyō* (大名) competed to have lavish gardens in Edo after the *shōgun* (将軍), or the hereditary commander in chief in feudal times, ordered the *daimyō* to all have residences in the capital. If you were a *daimyō*, you were certainly expected to entertain the *shōgun* with your *teien* but *teien* also served the practical purpose of keeping water nearby so fires could be extinguished (Nishiyama, 2014). Nearly 1,000 gardens existed in Edo (modern Tokyo) at that time. The feudal lords were beginning to build them en mass, especially the Tokugawa clan or *bafuku* (徳川幕府), the most powerful *shōgunate* family of the Edo Period (1603 to 1867) (Editors of the Encyclopedia Britannica, 2019). Hamarikyū Gardens (浜離宮恩賜庭園 or *Hama-rikyū Onshi Teien*), built in by the Tokugawa family in the 17th century, still exist today as



Image 19 - Trees behind a *teien* in Nara create the illusion the garden expands infinitely up the mountainside above. Source: Julie Musial.

a public park in the *Chūō* ward of Tokyo. It is primarily a pond garden with a tea house in the center of the pond, and the tide flows into the *teien* from the bay, bringing in ocean fish instead of the typical koi

(鯉) fish.

In the 1800s, a wealthy antique dealer named Sahara Kikū built the Mukojima Hyakkaen (向島百花園) gardens that were opened to the public for a small fee. This *teien* was unusual in that it featured 360 plum (*ume*) trees at inception. The merchant also planted many kinds of flowers for visitors and collected works of literature and poetry throughout the years, none of which were typical *teien* practices. However, people were reported to enjoy visiting the *teien* to write poetry and paint. It is now the only surviving flower garden from the Edo period. (Tokyo Metropolitan Park Association, n.d.)

CHAPTER FIVE: CASE STUDIES

Introduction

As previously stated, Japanese gardens are typically either pond, dry, or tea gardens. It is not common in Japan to have multiple gardens in one (n/a, 2018). The practice of combining several types of gardens into one larger garden or park is only typical outside of Japan, where the visitors can be exposed to several types of *teien* in one setting and therefore educated more efficiently. The Japanese-style gardens from the United States described later in this document all have multiple types of gardens in one location, whereas the case studies from Japan found below are each primarily one type of *teien* and a representative of one period in Japanese garden history.

It is important to distinguish between *teien* and *niwa* (庭). *Teien* in Japanese gardens that are considered more “rich,” stately, and almost guaranteed to have been created by and for the aristocracy (Kuitert, 2016). Related but conversely, *niwa* are the typical “homely” residential gardens of the common citizen (Kuitert, 2016), although they can be quite stunning in their appearance (see Image 20).



Image 20 - An interior garden in Kawazu. Source: Instagram.

The following gardens are considered not only culturally important *teien* in Japan but are all exceedingly well-preserved. Nijō Castle (二条城 or Nijōjō), for example, was designated a UNESCO World Heritage Site in 1994 (japan-guide.com, 2019a). All case studies have been visited by the author except for the Portland Japanese Garden. Individual garden elements and amenities will be described in more detail later in this document.

Gardens in Japan

Nijo-jo (Castle), Kyoto

Construction on Nijō Castle began in 1601-1603 as the Kyoto residence of Tokugawa Ieyasu, the first *shōgun* of the Edo Period, and was expanded by his successors, including when his grandson Kobori Enshu added a five-story keep 23 years later (Kuitert, 2016) (japan-guide.com, 2019a). The three main parts of the *teien* are the pond garden (*chitei*), the island (*hōrai*), and the castle grounds (Kuitert, 2016) (see Image 21). There is also a stone bridge which allows access to the *hōrai*.



Image 21 - Aerial view of the inner castle, Ninomaru Palace, of Nijo (Castle) in Kyoto. Source: Google Maps.

The theme of the Nijō *teien* could be interpreted as "an excuse to design a free island landscape" because the *hōrai* is so centralized, prominent, and heavily adorned (Kuitert, 2016, p. 33). The garden area, particularly around and in the pond, is filled with large stones of various shapes and sizes (see Image 22). Some believe the stones evoke turtles and cranes, symbols of



Image 22 - Boulders around the *chitei* and the stone bridge to access the *hōrai*. Source: Lisa Dunaway.



Image 23 - Azaleas in bloom on the Nijō-jō grounds. Source: Lisa Dunaway.

longevity in Japan, but it is unknown if those were intentionally selected and placed to represent those animals or if this is simply a modern interpretation (Kuitert, 2016, p. 34). There are also a number of shrubs in the *teien*, especially azaleas and junipers (see Image 23).

While the Nijō-jō grounds do have many paths, it is not a strolling garden. Strolling gardens, by generally accepted definition, must make the journey the experience, most notably through framed views and focal points encountered unexpectedly along the way. The paths in Nijō-jō are amidst the wide-open areas of the grounds, and while they often have a lovely flowering shrub at the confluence of two paths, they

are not so extraordinary as to be called focal points. Here the main attractions of the grounds are the *chitei* and *hōrai* with the secondary attraction the view from the highest tower in the complex, the castle *tenshukaku* (天守閣) (see Image 24). Other notable features include the

cherry and plum orchards and the maple, ginkgo, and other trees that provide spectacular color in the fall (japan-guide.com, 2019a).

Shinjuku Gyo-en, Tokyo

Shinjuku Gyo-en (新宿御苑) is one of the largest and most popular parks in Tokyo (japan-guide.com, 2019b).

It was built by the Naitō family in the Edo Period before being

converted into a botanical garden and given to the Imperial family in 1903 (japan-guide.com, 2019b). After World War II it became a national park maintained by the Ministry of the Environment (Ministry of the Environment, n.d.). While not strictly one type of garden overall like the other Japanese case studies, because it features an English landscape garden and a French formal garden, the Japanese garden itself is clearly a pond garden. It is not unusual for a national park to be a showcase for gardens from other cultures, much like the United States Botanic Garden in Washington, D.C., and the Royal Botanic Gardens at Kew in England.

While there are numerous paths throughout the park, the main focal points along the way are the amenities in the park such as the tea house, conservatory, or and restaurant. All paths eventually lead to the series of large ponds in the center of the park (see Image 25). It is 144 acres in total and the Traditional Japanese Garden area is now considered to be “one of the most important gardens from the Meiji Era” (Ministry of the Environment, n.d.).



Image 24 - View from the Nijō castle tenshukaku. Source: Lisa Dunaway.



Image 25 - Site plan of Shinjuku Gyo-en. Source: Wikimedia Commons.

The Japanese Garden is the oldest garden in the park and features the large *chitei*, some with *hōrai*, and sometimes crossed by bridges (Ministry of the Environment, n.d.) (see Image 26). The manicured shrubs typical of most Japanese gardens are obvious throughout the *teien* and are more prevalent than in the Nijō-jō grounds, but less emphasis is placed on the boulders in Shinjuku Gyo-en than in Nijō-jō. But like Nijō-jō, trees are the star of the show after the pond, and fall color is varied and remarkable.

Ryōanji Temple, Kyoto

With the introduction of Zen Buddhism in the Moromachi Period (1392-1573) came the dry landscape (*karesansui*), rock, or Zen garden (Seo, 2019). The purpose of these gardens was

mainly for contemplation and meditation as part of Zen rituals or practices. The gardens typically use white gravel to represent “flowing elements such as waterfalls, rivers, creeks, or sea, while rocks suggest islands, shores, or bridges” and the “the sea of gravel, rocks, and moss of the rock garden and the earthy tones of the clay walls contrast with the blossoming foliage beyond—



Image 26 - One of the chitei in the traditional Japanese garden area of Shinjuku Gyoen. Source: Lisa Dunaway.

evoking stillness and contemplation suitable for meditation" (Seo, 2019).

Ryōanji (龍安寺), or the “Peaceful Dragon Temple,” is in northern Kyoto at the foot of the Ryoanji Shuuyama mountains (Seo, 2019). Likely built in 1499 (Schaarschmidt-Richter, 1979), it was an important Zen temple and center for cultural activities in the late 16th through the early 17th centuries (Seo, 2019). It is now widely considered the greatest example of a dry landscape garden in the world (Schaarschmidt-Richter, 1979) and is listed on the Historic Monuments of Ancient Kyoto (Seo, 2019).

The specific meaning of the garden is not known but many theories and interpretations persist (Schaarschmidt-Richter, 1979). Fifteen boulders of different sizes are arranged in groups surrounded by raked white gravel (Seo, 2019) (see Image 27). The boulders are arranged such that no more than fourteen of the fifteen can be seen from any one place. The visitor is, perhaps unknowingly, encouraged to shift their gaze around the garden during contemplation (Schaarschmidt-Richter, 1979). It is generally agreed that it is up to each visitor to find their own meaning for the garden (japan-guide.com, 2019c).



Image 27 - The dry landscape garden at Ryōanji. Source: Lisa Dunaway.

While it is true most Japanese gardens do not have multiple types of gardens of equal importance in one area, and Ryōanji arguably fits into that definition with its famous dry landscape garden, there are other interesting elements in the overall site (see Image 28). The first major element the visitor encounters is the mirror pond, or Kyōyō Pond, which contains a *hōrai* accessible by a bridge. There is also a strolling element to the overall site, especially after visiting the abbot's personal living quarters, the *hōjō*, which also houses the viewing platform for the dry garden. The total length of the strolling path is longer after the dry garden, with views of the *chitei* and *hōrai* appearing along the way amidst the large trees and other vegetation. The *hōjō* also includes a moss garden called the West Garden, a stone and moss garden, and a garden with a tea house.

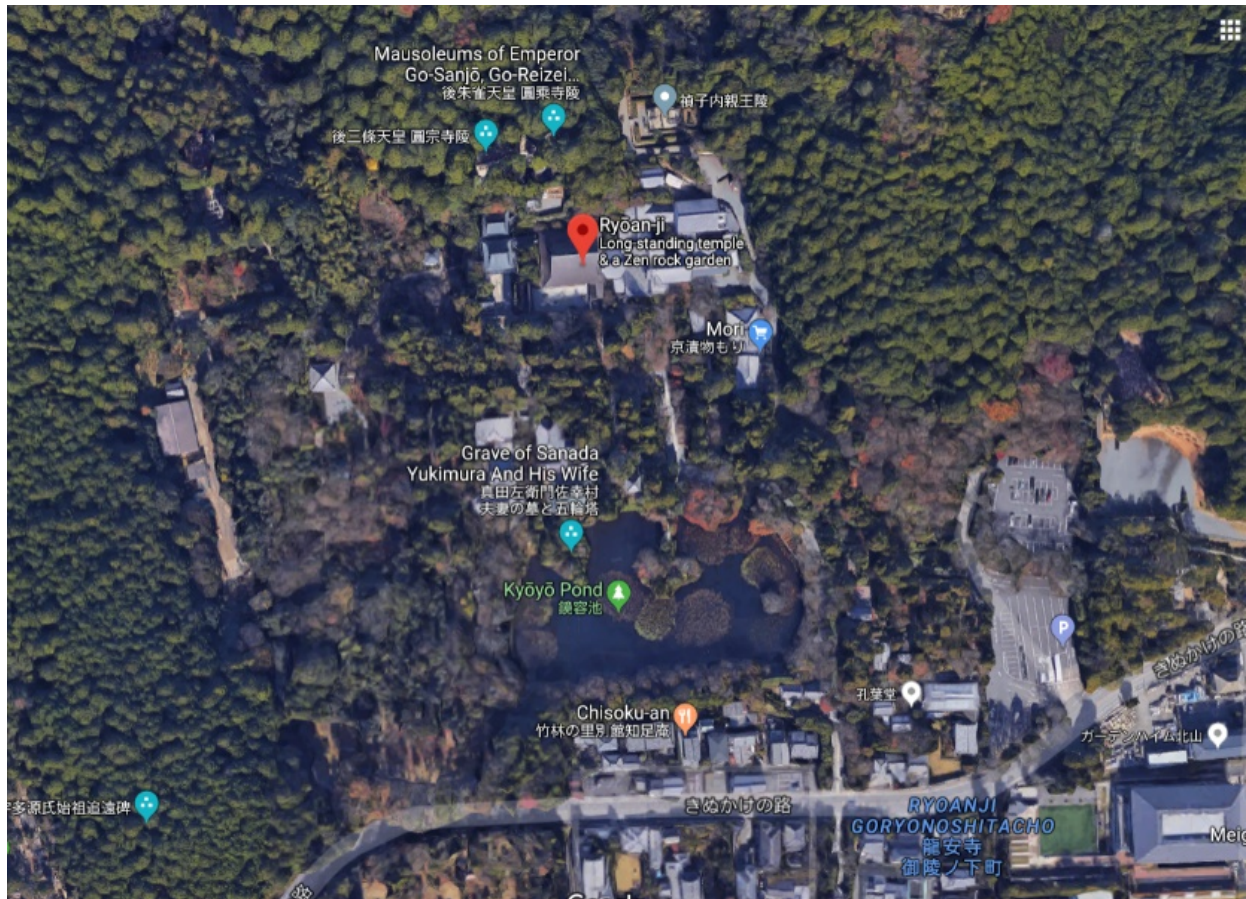


Image 28 - Aerial view of Ryoanji (Temple) in northern Kyoto. Source: Google Maps.

Gardens in the United States

Portland Japanese Garden – Portland, Oregon

Interest in Japanese gardens exploded in the United States in the 1960s, and the “most authentic and the most beautiful” example, the Portland Japanese Garden in Portland, Oregon, was created in the early- to mid-sixties (Brown, 1999). The designer of the garden, Takuma Tono, planned four types of *teien* within the larger site: The Flat Garden, the Tea Garden, the Strolling Pond Garden, and the Sand and Stone Garden (see Image 29). As a demonstration site for primarily American visitors, it is appropriate that all three of the main types of Japanese-style gardens are included.

The Flat Garden does not sound typical of a Japanese-style garden by name but takes the lesson of borrowed scenery as its main purpose. Within the Flat Garden is a pavilion which perfectly frames views of downtown Portland, Mount Hood (much like Mount Fuji is framed in the *teien* of Japan whenever possible), and a newer Viewpoint Garden is used for annual moon-viewing events (Brown, 1999).

The Tea Garden (*roji*) has an entry gate, waiting arbor (*machiai*), and the teahouse itself, the Flower Heart Pavillion (*Kashintei*). A common practice is to create an undulating path to a tea house through dense vegetation, secluding the *roji* but also forcing the visitor to slow down and mentally prepare for the ceremony (Nishiyama, 2014). This is also somewhat true for the Portland site, as the *roji* is the farthest element away from the entrance (see Image 29 again). Popular



Image 29 - Aerial view of the Portland Japanese Garden. Source: <http://japanesegarden.org/garden-spaces>.

amongst Japanese gardens worldwide, including Portland's, are educational opportunities where visitors can learn about Japanese culture: for instance, the tea ceremony (see Image 30).

North of the *roji* is the strolling pond garden, which as its name suggests, is a combination of a strolling garden and a pond garden, much like the *teien* at Nijō-jō. Elements in that part of the garden also include an upper pond lined by boulders, with a “moon bridge” spanning its outlet, an iris marsh, a wood-planked zig-zag bridge, a lower pond filled with *koi*, lots of vegetation, and the dramatic waterfall named Heavenly Falls (see Image 31). There is also an area now called the Natural Garden that was the Moss Garden when it was originally built in 1968. Like many moss gardens in Japan, the path travels through thickly vegetated areas, often with the path diverging and re-converging (Brown, 1999).

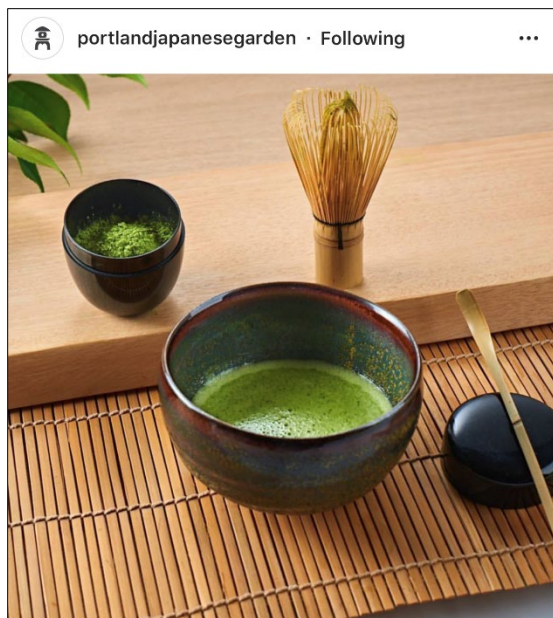


Image 30 - Photo from a tea ceremony at the Portland Japanese Garden. Source: Instagram.



Image 31 - Heavenly Falls at the Portland Japanese Garden. Source: Instagram.

On the northeast portion of the property is the Sand and Stone Garden (*sekitei*). It is Zen-inspired and enclosed by a stucco wall capped in tiles, much like Ryōanji's dry garden. There are seven stones set amongst raked gravel, each "facing" a large vertical stone near the center (Brown, 1999, p. 111). Information at the garden state the small stones represent seven tiger cubs swimming in the sea and the large stone symbolizing "the compassionate Buddha who saved them" (Brown, 1999, p. 111) (see Image 32).

Finally, the entry gate to the entire site is called the Daimyō Gate because it resembles the large, imposing gates that were built outside feudal *daimyō* estates. It was built in 1966 (Brown, 1999).



Image 32 - The Sand and Stone Garden at the Portland Japanese Garden. Source: Instagram.

Frederik Meijer Gardens – Grand Rapids, Michigan

The Richard & Helen DeVos Japanese Garden at Frederik Meijer Gardens was designed by Hoichi Kurisu and his firm Kurisu International. Mr. Kurisu also designed aspects of the Portland Japanese Garden as it evolved over time. The DeVos *teien* has areas very typical of Japanese-style gardens such as a tea house, dry garden (see Image 33), a waterfall (see Image 34), and a zig-zag bridge (see Image 35). But there are several properties that make the *teien* unique: There are a number of modern sculptures throughout the garden that are Asian-inspired but not traditional Japanese sculpture and the vegetation includes plants native to Michigan and not only plants native to Japan. (Frederik Meijer Gardens & Sculpture Park, 2019)



Image 33 - Zen-style Garden at the Frederik Meijer Gardens in Grand Rapids. Source: Lisa Dunaway.



Image 34 - Waterfall at the DeVos Japanese Garden in the Frederik Meijer Gardens. Source: Lisa Dunaway.



Image 35 - The zig-zag bridge in the DeVos Garden at the Frederik Meijer Gardens. Source: Lisa Dunaway.

The Tea House was constructed in Japan, disassembled, shipped to Michigan, and reassembled in the DeVos Garden (Frederik Meijer Gardens & Sculpture Park, 2019). It is visible from every point in the Japanese garden (Frederik Meijer Gardens & Sculpture Park, 2019), which as previously mentioned, makes it somewhat unique because many traditional tea houses in Japan are secluded in dense vegetation or at the farthest point away from the entrance (see Image 36). The Zen-style garden contains large boulders and raked gravel (see Image 33 again), placed by design Kurisu-san himself, and is located adjacent to the noteworthy Meijer bonsai collection (Frederik Meijer Gardens & Sculpture Park, 2019).

Bonsai (盆栽) and other vegetative displays, such as traditional Japanese flower arrangements (*ikebana* or 生け花), are often temporary in *teien* in Japan itself. They are seasonable exhibitions meant to promote and celebrate local artisans. However, the Meijer Gardens has a substantial selection of bonsai that are displayed outdoors in good weather and moved into one of the greenhouses when necessary (see Image 37).

There are four waterfalls at the DeVos *teien*, with the two main waterfalls on the north and south of the garden, representing feminine and masculine qualities (Frederik Meijer Gardens & Sculpture Park, 2019).



Image 36 - The tea house in the center of the DeVos Garden pond. Source: Lisa Dunaway.



Image 37 - Bonsai on outdoor display in the DeVos Garden. Source: Lisa Dunaway.

San Francisco Japanese Garden – San Francisco, California

The Japanese Tea Garden inside Golden Gate State Park is the oldest Japanese-style garden outside of Japan (Brown, 1999). It was originally created as a “Japanese Village” for the 1894 California Midwinter International Exhibition and featured a Japanese-style garden. It was later designed and maintained by landscape architect Makoto Hagiwara, who expanded the garden from one acre to five acres and lived there with his family until it became an internment camp for Japanese Americans in 1942. After the war was over, the Hagiwara family was not allowed to return to their home and changes were made to the *teien* throughout the years. However, the Tea Garden remains an extremely popular destination in San Francisco. It includes a cafe, an arched drum bridge (see Image 38), multiple pagodas (see Image 39), stone lanterns (see Image 40), koi ponds (see Image 41), and a dry garden. (Japanese Tea Garden San Francisco, 2019) The dry garden is quite minimal in comparison to the other case studies presented in this document. The showpieces of the *teien* are arguably the drum bridge, pagodas, and main koi pond.



Image 38 - Drum bridge at the Japanese Tea Garden in Golden Gate State Park. Source: Lisa Dunaway.



Image 39 - One of the pagodas at the Tea Garden in Golden Gate State Park. Source: Lisa Dunaway.



Image 40 - Stone lantern in the Tea Garden at Golden Gate State Park. Source: Lisa Dunaway.



Image 41 - Koi in the Tea Garden at Golden Gate State Park. Source: Lisa Dunaway.



Source: Lisa Dunaway.

CHAPTER SIX: GARDEN COMPONENTS & DESIGN ELEMENTS

Introduction

The proposed site plan for this Japanese-style garden in Columbus, Indiana, includes an entry gate and parking lot, visitor's center, learning center, tea house, dry garden, upper pond with an overlook and waterfall, stream, bridge, lower pond with an island, pavilion, and intermediate gates (see Image 42). Each element is described in detail below along with visual examples from case studies or renderings of proposed elements.

Gates

Entrance gates (*soto-mon* or *rojo-mon*) were common for *teien* throughout their history. The gate may lead the visitor into the *teien* from the street, onto a walkway that leads to the entrance to a residence, or into a larger *teien* that is part of a residential property (Keane, 2009). A gate is a visual cue that the visitor is entering the garden and also a mental cue that the outside world is to be left behind. Especially when entering a tea garden, the entry gate is a signal that it is time for the visitor to separate themselves from the "activities of the world and the state of mind that accompanies it" (Keane, 2009, p. 198).

These entrance gates are often free-standing and not meant for any sort of defensive purpose even though some of them have the ability to be locked. Regardless, the gate doors are always solid panels that block the garden visually from the outside world. (Keane, 2009) *Soto-mon* are not the iconic torii gates found at Shinto shrines, typically in the classic Chinese red color but also sometimes white or natural, unless the Japanese garden is part of a site that contains a shrine or the shrine happens to have a *teien*. Examples of *soto-mon* from the Tea Garden at Golden State Park are shown in Image 43 and Image 44 and could be used as the basis for the entry gate into this proposed site. The *soto-mon* for this proposed site would be lockable and connected to a larger fence system to keep the *teien* secure during off-hours.

Image 42 - Proposed Site Plan.
Source: Lisa Dunaway.





Image 43 - The older entrance gate to the Tea Garden at Golden Gate State Park. Source: Lisa Dunaway.



Image 44 - The current soto-mon to the Tea Garden at Golden Gate State Park. Source: Lisa Dunaway.

Visitor's Center

Visitors would first be given a visual cue of the garden's location because of the exterior walls along Goeller Road and then entrance signage welcoming them into the site. An example of the exterior stucco walls with a tile roof can be seen in Image 45.



Image 45 - An exterior wall of the Nijō-jō grounds. Source: Julie Musial.

The parking lot would include green infrastructure methods such as stormwater infiltration between the parking rows, where water would enter the infiltration basin in curb cuts. Visitors would have to access the *teien* itself by passing through the Visitor's Center. A lockable outer gate would provide access to the inside of the site without needing to pass through the Visitor's



Image 46 - A gate in the interior grounds of Nijō-jō. Source: Julie Musial.

Center. An example of how the outer gate, middle gate (*chūmon*) near the Learning Center, and inner gate (*uchi-mon*) near the Tea House might look is seen in Image 46, above.

The Visitor's Center could house administrative areas, restrooms, and a gift shop, and have a variety of different appearances from very traditional to quite modern. However, a structure that has a lot of glass on the first floor, allowing for the guest to see through the Visitor's Center into the garden beyond, might be an effective way to welcome people and draw them into the grounds. In this case, an architectural style reminiscent of Kengo Kuma's Ohbu, Akuya parking area in Aichi Prefecture (see Image 47), Garden Terrace in Miyazaki (see Image 48), or Nezu Museum in Tokyo could be appropriate (see Image 49). This idea is not without precedent, as Kuma designed the Visitor's Center for the Portland Japanese Garden in 2015 (Portland Japanese Garden, n.d.).



Image 47 - Parking area in Ohbu, Akuya. Source: <http://kkaa.co.jp/works/architecture>



Image 48 - Garden Terrace in Miyazaki. Source: <http://kkaa.co.jp/works/architecture>



Image 49 - Interior of the Nezu Museum in Tokyo. Source: <http://kkaa.co.jp/works/architecture>

Plants

Japanese Native Plants

Given that Japan is an island-nation, gardeners did not historically import plants from other countries as it was logistically difficult. However, gardeners were also more interested in the local flora, and they still are. One notable exception is the chrysanthemum, brought east from the Chinese mainland. Daffodils also have lesser popularity in some Japanese gardens, although it is not known when they were imported. However, it is clear they have been cultivated in Japan for at least a millennium. Otherwise, native plants were the stars of Japanese gardens, particularly evergreens and those plants with interesting textures and foliage. Japanese botanists estimate there are over 5,600 native species of flowering plants, conifers, and ferns in Japan. (Levy-Yamamori & Taaffe, 2004)

Form and Color

While plants are not considered the main point of Japanese gardens, they are important because of their symbolism (Goto & Naka, 2016). Unlike western-style gardens, textures and the shape of the plant's habit are far more important than color in Japanese gardens. Dense, mass plantings are not common, because that would make it more difficult to pick out the uniqueness of individual plants and decipher what they symbolize. Instead, statement plants with distinctive foliage, texture, and/or habits are located in places of prominence or high visibility (see Image 50). If a plant with notable form is already growing where a garden will be installed, the garden will be designed around it to give it a place of special importance, such as the sacred camphor tree named "Daiwa" on the grounds of Kamiya Shrine in Atami, Japan. The grounds of the

shrine were laid out to display and protect this now 2,000-year old tree (see Image 51) (來宮神社は, 來宮神社).

The Japanese love of art, form, and craftsmanship is clear in their tradition of pruning trees and shrubs into rounded habits, most especially when it comes to azaleas and evergreens like in the *Pinus* family. Japanese gardens are miniature representations of scenery; therefore, slow-growing and woody plants are preferred (Goto & Naka, 2016). It is a common design tactic to plant large numbers in one area of a *teien* and to carefully prune each plant into a dome, as to visually separate it from its neighbors and allow any unique characters it has to show through (see Image 52).

Also, as evidenced by Image 52 and Image 53, color does come into play in Japanese gardens in the spring and fall. Flowering perennials are not common as in western-style gardens, but flowering trees like the famous Cherry (*sakura*) trees that flower in late March and azaleas that bloom in late April and early May are the



Image 50 - *Pinus densiflora* 'Umbraculifera' at Shinjuku Gyoen Nation Garden in Tokyo. Source: (Levy-Yamamori & Taaffe, 2004).



Image 51 - A sacred camphor tree named "Daiwa" in Kamiya Shrine in Atami, Japan. Source: Kyle Johnson.

most celebrated. The fall color of some deciduous trees, especially the prominent red of Japanese maples (*Acer japonica*) is likewise honored.

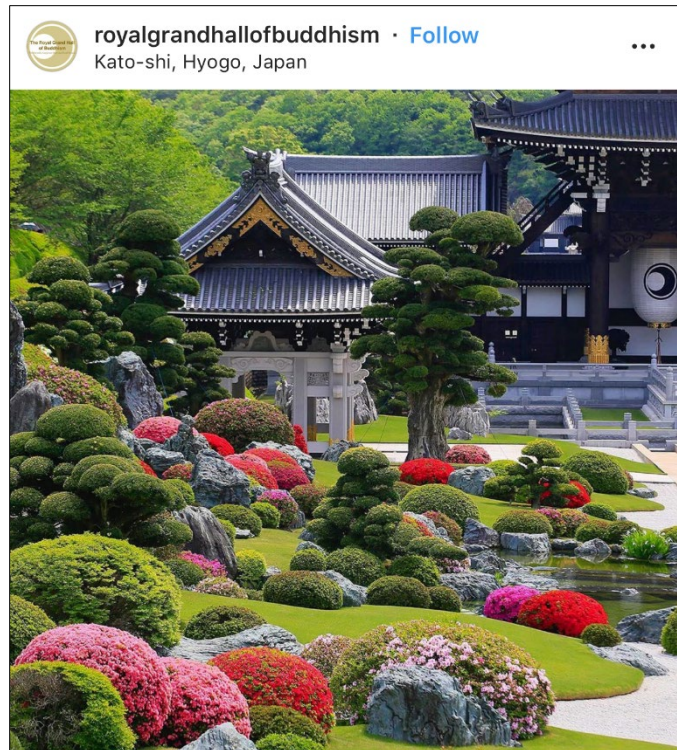


Image 53 - Carefully pruned trees and shrubs at Kato-shi in Hyogo, Japan. Source: Instagram.



Image 52 – Fall color at the Portland Japanese Garden dry garden. Source: Instagram.

Proposed Indiana Native Plants

In this proposed garden, Indiana native plants with interesting foliage, such as Sassafras trees (*Sassafras albidum*) and Tulip trees (*Liriodendron tulipifera*) are suggested. American Beech trees (*Fagus grandifolia*) are recommended because of their distinctive habit and bark upon reaching maturity. As evergreens equivalent to their Japanese counterparts, White and Virginia Pines (*Pinus strobus* and *virginiana*) and Balsam Fir (*Abies balsamea*) are proposed. As a counterpart to the spring bloom schedule and color of *Sakura* trees and azalea shrubs, Eastern Redbuds (*Cercis canadensis*) bloom pink in late March and can be trimmed into multi-stem shrub forms or allowed to grow into tall trees. Fall color can be showcased by large deciduous trees such as the Red Maple (*Acer rubrum*).

In terms of recommended shrubs, shrubs with striking leaves such as Mapleleaf Viburnum (*Hydrangea quercifolia*) are recommended. American Black Elderberry (*Sambucus canadensis*) have rounded habits similar to the dome-like forms enjoyed in Japanese gardens. Semi-evergreens such as Winterberry (*Ilex verticillata*) and Northern Bayberry (*Myrica pennsylvanica*) can provide year-long interest. For striking blooms, perhaps no native shrubs are showier than the Swamp Marsh Mallow (*Hibiscus moscheutos*) and the Mountain Laurel (*Kalmia latifolia*).

While perennials and grasses are not used nearly as extensively as trees, shrubs, and ferns in traditional Japanese gardens, some Indiana natives recommended for their beautiful color or form are Blue Flag Iris (*Iris crisata*) and Cardinal Flower (*Lobelia cardinalis*). A non-flowering perennial excellent for covering the ground in the shadier areas of the garden is Wild Ginger (*Asarum canadense*). Finally, Indiana ferns which are the perfect substitutes for their Japanese counterparts are Ostrich Fern (*Matteuccia struthiopteris*) and Christmas Fern (*Polystichum acrostichoides*).

Planting Plan

| Key | Latin Name | Common Name | Bloom time + Color |
|---------------|--------------------------------|---------------------------|-----------------------------|
| Trees | | | |
| AB | <i>Abies balsamea</i> | Balsam Fir | n/a |
| AR | <i>Acer rubrum</i> | Red Maple | March-April, Red |
| BN | <i>Betula nigra</i> | River Birch | Non-showy |
| CC | <i>Cercis canadensis</i> | Eastern Redbud | April, Pink |
| DV | <i>Diospyros virginiana</i> | American Persimmon | |
| FG | <i>Fagus grandifolia</i> | American Beech | April-May, Yellow-ish |
| JV | <i>Juniperus virginiana</i> | Eastern Red Cedar | n/a |
| LT | <i>Liriodendron tulipifera</i> | Tulip Tree | May-June, Yellow |
| MC | <i>Malus coronaria</i> | Sweet Crabapple | |
| MG | <i>Magnolia grandiflora</i> | Southern Magnolia | May-June, White |
| QI | <i>Quercus inbricaria</i> | Single Oak | April, Yellow-ish |
| PS | <i>Pinus strobus</i> | White Pine | n/a |
| PV | <i>Pinus virginiana</i> | Virginia Pine | n/a |
| PR | <i>Prunus serotina</i> | Black Cherry | April-May, White |
| SA | <i>Sassafras albidum</i> | Sassafras Tree | April-May, Green-ish |
| SN | <i>Salix nigra</i> | Black Willow | March-April, Yellow-ish |
| Shrubs | | | |
| AM | <i>Aronia melanocarpa</i> | Black Chokeberry | May, White |
| CO | <i>Corylus americana</i> | American Hazelnut | March-April, non-showy |
| CS | <i>Cornus sericea</i> | Red Twig Dogwood | May-June, White |
| EA | <i>Euonymus atropurpureus</i> | Eastern Wahoo! | June, Dark purple |
| HA | <i>Hydrangea arborescens</i> | Smooth Hydrangea | June-Sept, White |
| HM | <i>Hibiscus moscheutos</i> | Swamp Marsh Mallow | July-Sept, Pink to burgundy |
| HQ | <i>Hydrangea quercifolia</i> | Mapleleaf Viburnum | May-July, White to pink |
| HV | <i>Hammamelis virginiana</i> | Common Witch Hazel | Oct-Dec, Yellow |
| IL | <i>Ilex verticillata</i> | Winterberry | June-July, Green-ish |
| KL | <i>Kalmia latifolia</i> | Mountain Laurel | May, White to pink |
| LB | <i>Lindera benzoin</i> | Northern Spicebush | March, Green to yellow |
| MP | <i>Myrica pensylvanica</i> | Northern Bayberry | May, Yellow-ish |
| PF | <i>Potentilla fruticosa</i> | Potentilla | June-Sept, Yellow |
| RG | <i>Rhus glabra</i> | Smooth Sumac | June, Yellow-ish |
| SC | <i>Sambucus canadensis</i> | American Black Elderberry | June-July, White |
| VP | <i>Viburnum prunifolium</i> | Blackhaw Viburnum | May-June, White |

Perennials, Bulbs & Grasses

| | | | |
|-----|------------------------------|-----------------------|---------------------------|
| AC | Anemone canadensis | Anemone | April-June, White |
| AS | Asarum canadense | Wild Ginger | April-May, Purple-brown |
| CA | Campanula americana | Tall Bellflower | June-August, Blue |
| CP | Carex pensylvanica | Pennsylvania Sedge | May, Green-ish |
| EL | Equisetum laevigatum | Smooth Horsetail | n/a |
| IC | Iris crisata | Drawf Crested Iris | April, Pale blue |
| IR | Iris versicolor | Blue Flag Iris | May-June, Violet blue |
| LC | Lobelia cardinalis | Cardinal Flower | July-Sept, Red |
| NL | Nelumbo lutea | American Lotus | June-July, Pale yellow |
| PB | Polygonatum biflorum | Smooth Solomon's Seal | April-May, Greenish-white |
| RH | Rudbeckia hirta | Black-eyed Susan | June-Sept, Yellow |
| SU | Sorghastrum nutans | Indian Grass | Sept-Feb, Brownish-yellow |
| SNA | Symphyotrichum novae-angliae | New England Aster | Aug-Sept, Pink to purple |
| SP | Symphyotrichum patens | Spreading Aster | Aug-Oct, Blue to violet |
| VS | Verbena simplex | Narrow-leaved Vervain | May-July, Lavender |
| ZA | Zizia aurea | Golden Alexanders | May-June, Yellow |

Vines, Ferns & Mosses

| | | | |
|----|----------------------------|----------------|-----|
| MS | Matteuccia struthiopteris | Ostrich Fern | n/a |
| PA | Polystichum acrostichoides | Christmas Fern | n/a |

All plants shown in the planting plans later in this document are outlined in the plant schedule below. Images of the 100+ most common Japanese native plants used in Japanese gardens and their Indiana native equivalents, based primarily on species, form, and color, are found in the appendix of this document.



Source: Lisa Dunaway.

Pond

Ponds were designed during the Heian Period to be viewed from the house and used as a means to display the wealth and status of feudal lords. Some shoguns even demanded their lords have a garden at each of their three required estates in Edo and ponds were a common feature. Lords would take visitors out in rowboats for drinking parties, to compose poetry, or play music. Later, during the Kamakura Period, ponds were designed to be walked around to encounter intentional and directed views. These *teien* were often called "strolling gardens." Ponds in these later periods came to symbolize the ocean and some had secondary meanings. (Nishiyama, 2014) Rocks (*iwakura*) could be situated in the water to symbolize islands or mountains, or as a rest for turtles or birds (Goto & Naka, 2016) and are often used around the perimeter of ponds, waterfalls, and streams.

Island

The first view encountered by the guest upon reaching or passing through the Visitor's Center will be the lower pond, which takes up a large amount of the overall *teien*, and the island at its center (see Image 54). The pond itself is an organic shape, conducive to be strolled around, as will be explained in detail later this document. The island would be dominated by a large Black Willow tree (*Salix Nigra*) with some flowering and semi-evergreen shrubs used sparingly around the perimeter of the island. A variety of *iwakura* would frame the island and fade out into the water along with water plants such as American Lotus (*Nelumbo lutea*). Lanterns, described later in this document, could also provide tertiary focal points, becoming more obvious in the winter when most of the plants have defoliated (see Image 55).

Nishikigoi

The fish commonly referred to as koi (鯉) in the west are actually *nishikigoi* (錦鯉), which directly translates to "brocaded carp" (LiveAquaria, 2019). In Japan, Koi is a term that simply means

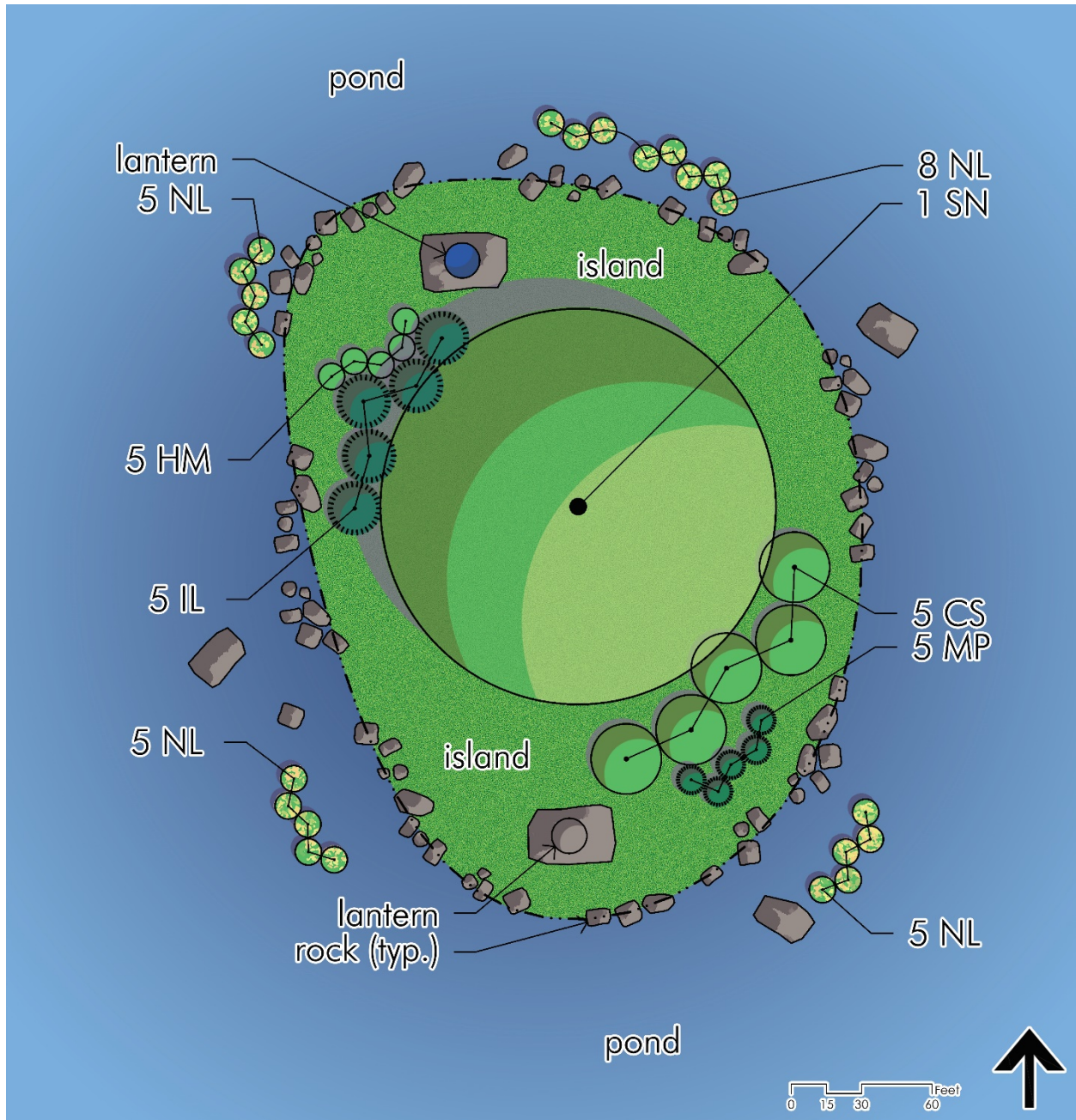


Image 54 – Rendered site and planting plan for the central island. Source: Lisa Dunaway.

“carp” and can refer to any color of carp (It’s a Fish Thing, 2019). *Nishikigoi* are the colored varieties of Amur Carp (*Cyprinus rubrofuscus*) that are an essential component in Japanese pond gardens (see Image 56). They are different from goldfish, which were bred in China starting over one-thousand years ago (It’s a Fish Thing, 2019). *Nishikigoi* have been bred in Japan

since the Edo Period and are generally larger than goldfish. To get colors such as orange, white, red, black, cream, and brown, *nishikigoi* have to be selectively bred for over 30 generations. If they are not carefully bred or escape into the wild, they will revert back to their original grey color in about three generations.

Nishikigoi are considered noxious pests in many countries around the world where they are not native. They increase the turbidity of water because they feed at the bottom and stir up the substrate, reducing the number of aquatic plants and often making the water undrinkable, even for livestock (USGS, 2018). Some countries have spent vast amounts of money trying to eradicate them, often unsuccessfully (USGS, 2018). Given the goal of this proposed garden to have only native plants, it follows that any fish established in the pond should also be native to Indiana. The pond would be designed to have 10' safety shelves around the perimeter of the pond and island, for liability reasons, but would be at least ten feet deep at the deepest point.



Image 55 - Example of a stone lantern.
Source: Lisa Dunaway.



Image 56 - Nishikigoi in a pond at Kinomiya-jinja in Atami, Japan. Source: Lisa Dunaway.

That depth would allow for fish to reproduce and stay healthy in the winter when the water would become cold at the surface and potentially freeze.

Rocks

Boulders and rocks (*iwakura* or 岩倉) have particular symbolic importance in Japanese gardens. The shape of stones can represent long life or a concern for family (Nishiyama, 2014). Since *teien* and *niwa* were both historically considered to be a place where the gods would congregate, the *iwakura* were also a natural place to effectively trap a god, and therefore became a standard feature in Japanese gardens. A rock is turned into a religious object by tying a *shime* (注連), or white paper rope, around it. This is said to enshrine the *kami* (神), or gods, as they “descend from a big rock in the mountains” according to Shinto tradition. (Goto & Naka, 2016) *Iwakura* are plentiful in all Japanese-style gardens, whether they are moss, pond and strolling (see Image 57), or dry gardens (see Image 58).



Image 57 - *Iwakura* at Ryotan-ji in Hamamatsu. Source: Instagram.



Image 58 - *Iwakura* in Komyo-in in Kyoto. Source: Instagram.

Learning Center

After entering the *teien* and strolling on the south end of the pond, the visitor will encounter the Learning Center. Such structures are common in western Japanese-style gardens as a place to hold classes, performances, and events, or to rent out to clients. They are often traditional Japanese architectural styles and can even be tea houses or other structures relocated from Japan (see Image 59). The Portland Japanese Garden, however, has an entire cultural village dedicated to visitor education designed by Kengo Kuma, which is quite modern in style (Portland Japanese Garden, n.d.) (see Image 60).



Image 59 - A traditional Japanese structure in Kyoto. Source: Instagram.



Image 60 - The Cultural Village at the Portland Japanese Garden. Source: (Portland Japanese Garden, n.d.).

Tea Path and Garden

Past the Learning Center, the guest will encounter the aforementioned Middle Gate (*chūmon*) which leads to the Tea Path (*roji no michi*). A tea garden is “essentially just a path” (Keane, 2009) designed to slow down the visitor and create the correct frame of mind for participating in a tea ceremony. In Japan, stepping stones are the most common type of material used for tea paths because the uneven surface will naturally slow the visitor, which will, in turn, slow the heart rate and breathing and hopefully lead to a more contemplative mood (Keane, 2009). However, in the proposed garden, almost all of the paths would be a smoother surface in order to meet ADA requirements. Examples of possible surface treatments are shown in Image 61 and Image 62. One exception will be a stepping stone path that diverts from the main tea path near the tea house, which could look something like the stones shown in Image 63.



Image 61 - Example of stepping stones in a Japanese garden. Source: Instagram.



Image 62 - Walking path in Ninna-ji in Kyoto. Source: Lisa Dunaway.



Image 63 - Stepping stone path at the Portland Japanese Garden. Source: Instagram.

As shown in the plan for the Tea Path and Garden (see Image 64), the path winds to slow the visitor down, since the surface treatment cannot. After walking through a cooler and darker area of the *teien* created the dense planting of mostly evergreens, the visitor will encounter a 90-degree left turn in the Tea Path and see an outer waiting bench (*soto koshikake*) and a stone lantern (*tōrō*) for rest and contemplation. Next, the aforesaid inner gate (*uchi-mon*) frames a view of a basin or well, which could take a variety of forms from traditional (see Image 65) to modern (see Image 66). Either a basin or well would be an

appropriate complement to the Tea House, as water elements are traditionally placed near tea houses for “subtle stimulation” (Kuitert, 2016, p. 87) and also for purification, as will be described later in this document.



Image 64 - Rendering site and planting plan for the Tea Path and Garden. Source: Lisa Dunaway.



Image 65 - A traditional well at Kinomiya Shrine in Atami, Japan. Source: Lisa Dunaway.



Image 66 - The path approaching the Tea House, including a modern-style well. Source: Lisa Dunaway.

Tea House

The Tea House itself could be a structure brought over from Japan or a newly-designed building meant to look like a traditional Japanese tea house. Arguably, the Tea House would be the most important building to be traditional architecture in the entire garden because of its iconic status in the world and the importance of specific structural elements. The list of traditions surrounding tea gardens and houses is nearly endless, from the order in which guests arrive and what tasks they are assigned, to the number of stones leading to the Tea House door, to the size of interior spaces for accommodating tatami mats. (Keane, 2009) And this is to say nothing of the rules governing the tea ceremony itself. Therefore, the Tea House should be very traditional and accurately designed in order to be respectful and representative of the functions it will serve.

Moss

The dense planting of evergreens would allow for this part of the *teien* to have moss on the ground. Some Japanese gardens are entirely devoted to showcasing moss (Suzuki, 2012), while others have shaded areas where moss is allowed to cover the ground (see Image 67).

Japanese mythology states that moss gardens are home to tiny forest creatures, and moss has been a symbol of eternity for more than 1,000 years in Japan. Even the Japanese national anthem mentions moss. There are over 1,700 species of moss native to Japan because of its moist climate, and the haircap mosses are the most famous.

Surprisingly, some mosses like sunny places because they need to photosynthesis more vigorously than their shade-dwelling cousins. But all like to grow where they can get morning or evening dew because they are all leaves and stalks with no roots. Moss can attach to trees and rocks with rhizoids, so it is often seen in dry gardens. Some consider the most important rule of moss to be that the species of moss must naturally grow under a pine tree if it is to be placed under a pine tree in a *teien*. (Suzuki, 2012)



Image 67 - Moss-covered ground in the Japanese Garden at Golden Gate State Park. Source: Lisa Dunaway.

Strolling path

Much like Nijō-jō and the Portland Japanese Garden, this proposed garden would have most of its strolling paths focused around the pond, although there are diversions to the Tea House, Dry Garden, and behind the Pavilion (refer back to Image 42). Strolling paths were meant primarily for leisure (Goto & Naka, 2016) and often had notable garden elements such as a stone lantern deliberately placed at a bend or bifurcation in the path (see Image 68). Conversely, a tree or shrub with a noteworthy habit, flower, or fall color might be located in similar places. Strolling paths are often delimited not only by the pavement or stones but short fences (see Image 68 again), to keep visitors from disturbing the carefully maintained plants, moss, or gravel.

Strolling paths often allow for direct access to water elements in Japanese gardens (see Image 69). It is common to see large, flat stepping stones leading right into the water from the pathway. However, as this



Image 68 - Strolling path in the Japanese Garden at Golden Gate State Park. Source: Lisa Dunaway.



Image 69 - Direct access to a pond via a stone path. Source: Instagram.

would typically not be allowed in the United States for liability reasons, the proposed garden would have resting places with benches near the pond, focused on the island, between the Learning Center and the middle gate (see Image 42 again).

Dry garden

As previously described in the Ryōanji case study, dry gardens (*karesansui* or 枯山水) are often called Zen gardens and are arguably the most unique type of Japanese garden (Kazuhiko, 1970). Dry gardens have no water and instead use raked gravel to symbolize the ocean or rivers, with *iwakura* strategically placed amongst the gravel to represent mountains or islands (Kazuhiko, 1970) (see Image 70). In the proposed garden, the Dry Garden would be placed in the northeastern-most part of the overall site (refer back to Image 42). Much like at Ryōanji and many other dry gardens, the proposed dry garden would have a long overhead structure open



Image 70 - Dry garden in Arashiyama, Kyoto. Source: Lisa Dunaway.

to the enclosure, where visitors could sit directly adjacent to the raked gravel (see Image 59). The garden would be surrounded by a traditional stucco fence capped with a tile roof (see Image 71 again).



Image 71 - Dry garden at Ryōanji with viewing platform and stucco surround. Source: japan-guide.com.

Waterfalls

As described earlier in this document, waterfalls are often built into *teien* to represent famous waterfalls around Japan (see Image 72), but they can also take on religious meaning, as well. For example, at Eihō Temple in Tajimi City, Japan, the waterfall was placed such that visitors could hear the sound of the water and know it represents the voice of Buddha (Goto & Naka, 2016). While this is an interesting fact, the waterfall proposed in this garden would not have religious symbolism. However, the water would still be able to be heard as the guest would ascend up the hill on the northwestern portion of the site to the upper garden and pond via a stone staircase, such as the one seen in Image 73. While that path on the northern side of the hill would be a set of stone stairs, the path to the south of the hill would be ADA accessible and allow for those in wheelchairs to see the view.

Upper ponds and gardens are common in gardens with waterfalls when the topography and site layout are conducive. In Buddhist temples, upper gardens are designed for monks to train in meditation in solitude, and there is often a large meditation rock on which the monk would sit, called a *zazen*. In the proposed garden, a sheltered overlook structure would be at the top of the upper pond, overlooking the entire site (see Image 74). (Goto & Naka, 2016)

The hillside surrounding the upper pond and stream would be primarily a crushed gravel surface under evergreen and deciduous trees, with some flowering perennials, grasses, and ferns. Other minor elements such as a water basin and stone lantern, described later in this document, would surprise visitors along their way around the upper pond. A stream would lead downhill from the upper pond, under a classic Japanese bridge in Chinese red, to the lower, main pond (see Image 75 and Image 76). Streams in Japanese gardens typically feature a series of rocks, boulders, shrubs, and other plants, as seen in Image 77).



Image 72 - Waterfall in the Portland Japanese Garden. Source: Instagram.

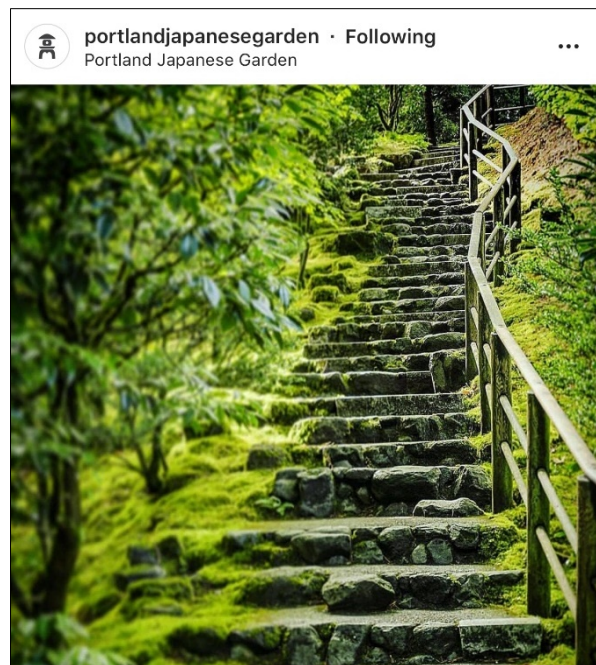


Image 73 - A stone staircase in the Portland Japanese Garden. Source: Instagram.



Image 74 - Rendering of the waterfall, stream, and bridge. Source: Lisa Dunaway.



Image 75 - A classic Chinese red bridge in Nikko National Park. Source: Instagram.



Image 76 - A stream in a Japanese garden. Source: Lisa Dunaway.



Image 77 - Rendered site and planting plan for the waterfall area. Source: Lisa Dunaway.

Pavilion

Areas for displaying temporary exhibitions are common in Japanese-style gardens outside of Japan, much like how bonsai are featured at the Frederik Meijer Gardens. However, inside of Japan, exhibition spaces are more commonly found in Shinto shrines, such as the Museum Annex Building at Meiji Jingu in Tokyo (japan-guide.com, 2019d). The Annex is a series of long pavilions, open on one side, where bonsai and *ikebana* are often showcased (see Image 78).



Image 78 - *Ikebana* display in a pavilion at Meiji Jingu in Tokyo. Source: Tokyo Penguin.

Bonsai and *ikebana*, or the Japanese art of flower arrangement, are traditional art forms involving the manipulation of plants. Bonsai literally translates to “tray planting” (Bonzai Empire, n.d.) and the plants are trimmed and trained into unique shapes meant to represent full-size trees (refer back to Image 37).

Ikebana can be translated as

“arranging flowers” or “making flowers alive” but is also known as *kadō* (華道) or the “way of flowers” (FTD, 2015). *Kadō* is considered one of the three classical Japanese arts of refinement along with *kōdō* for incense appreciation and *chadō* for tea and the tea ceremony. As such, it would be appropriate to have a place to display these traditional Japanese art forms, and others, in the pavilion on this proposed site. The pavilion is located to the west of the lower pond

(see Image 42) and the open side would be open towards the lower pond for viewing (see Image 79). The pavilion would be ADA accessible, as well.

Other Garden Elements

“A Japanese garden is built not only with natural elements – soil, water, rocks, and plants – but also built elements such as lanterns, basins, bridges, and huts” (Goto & Naka, 2016).

Stone lanterns

The stone lantern was introduced to Japan when Buddhism made its way to the country, and it was the staple lighting fixture in temples from the Nara Period (Nara jidai or 奈良時代), AD 710 to 794 forward (Goto & Naka, 2016). Lanterns are one of the few sculpted elements in a Japanese



Image 79 - Rendering of the proposed pavilion. Source: Lisa Dunaway.

garden, typically made from granite, and the shape is typically indicative of the region in Japan from which it came (see Image 80) (Goto & Naka, 2016).

Lanterns would be placed around this proposed site at resting and/or focal points, notable places along the strolling paths, or be tucked into the vegetation to surprise the observant visitor.



Image 80 - Lantern in a Japanese garden.
Source: Julie Musial.

Water basins

Water basins or *tsukubai* (蹲踞) were originally found at the entrances to temples and shrines, so visitors could cleanse their hands and mouths before entering sacred areas. As previously mentioned, basins or wells are usually placed near the entrance to tea houses, and one is sited near the Tea House in this proposed. The purification ritual was introduced to the tea ceremony during the Muromachi Period (Muromachi jidai 室町時代), from 1336 to 1573. Because of the emphasis on purification, basins are one of the most important elements in a Japanese garden even though they are one of the smallest features. (Goto & Naka, 2016)

Basin can take a variety of forms from quite traditional (see Image 81) to very modern (see Image 82) but are typically carved from stone. Occasionally, a basin will be made from a recycled sculpture such as a lantern or the stone base of an old temple column.



Image 81 - A traditional basin at Ryōanji in Kyoto. Source: Kyle Johnson.

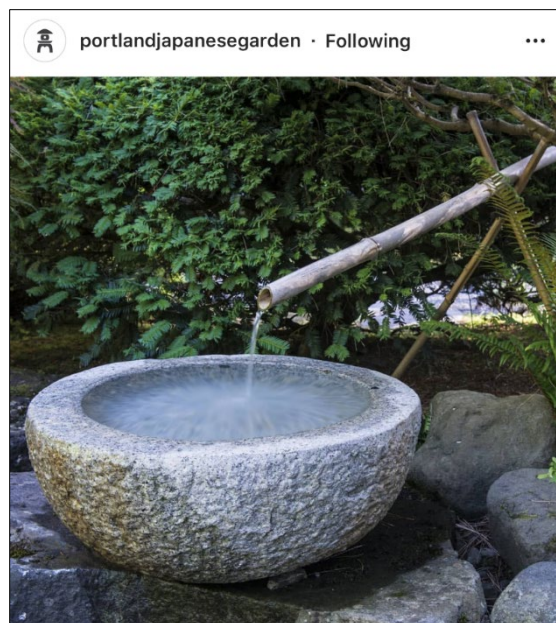


Image 82 - Basin at Portland Japanese Garden. Source: Instagram.

CHAPTER SEVEN: CONCLUSION

In conclusion, the degree to which this project would be successful would have to be determined after installation. If one measure of accomplishment would be the number of visitors coming to the garden, that clearly could not be determined until the garden was established. Other specific areas that could only be judged as well-done after construction would be the Tea Path or Waterfall. In those two areas, user feedback would be required more than in other areas more straight-forward in design, such as the Pond or Dry Garden. One aspect of this project which is probably the highest achievement is simply the extensive list in the Appendix, where Indiana counterparts for each of the most common Japanese gardens plants are found.

The most authentic and visited Japanese-style garden in the United States is the Portland Japanese Garden, which had 356,000 visitors in 2016 (Heartquist, 2017). As Columbus is a much smaller city than Portland, the number of visitors is not likely to be anywhere near 356,000. Columbus as a whole was visited by 26,700 tourists in 2016 (Blair, 2018). However, Columbus is a destination for those who appreciate art and design, and as such, this garden would hopefully draw enough visitors to remain financially solvent.

To be an experience as authentic as possible, the Tea Path would need to feel like somewhat of a journey, removed from the rest of the garden, and lend itself to a slower and calmer state of mind. As it is currently designed, a planting of mostly evergreen trees is intended to create a visual barrier to the rest of the garden and help deaden external sounds. The path winds through the trees to help the visitor slow their step. There is also a bit of a berm between the strolling path around the pond and the Tea Path to also help dampen outside sound. Yet it is possible guests will not find the path long and/or isolated enough to induce the intended feelings of solitude and contemplation. If that is the case, the path may need to be re-designed, or at the very least, more vegetation added to increase the sense of enclosure and seclusion.

The Waterfall is the other area most likely to need re-design after visitor feedback is gathered. While mass plantings and extensive perennials are not common in Japanese gardens, they are often found adjacent to waterfalls and streams when found at all. Given the steepness of the hillside, down which the stream flows from the Upper Pond to the Lower Pond, it may be that the plantings do not appear too numerous once spread across the topography. The renderings provided earlier in this document are helpful to a degree for envisioning the Waterfall area but post-construction evaluation by expert Japanese garden designers would be an even more valuable tool.

According to Japanese garden plant experts Levy and Walker, there are approximately 100 plants commonly found in traditional Japanese gardens (Levy-Yamamori & Taaffe, 2004) (Walker, 2017). This document contains 120 of the most prevalent plants found in the overlap between the two sources and a corresponding substitute plant native to Indiana for almost every one of the 120 (see the Appendix). This extensive list is the basis for the success of the entire project, as the garden would not serve its most important purpose as habitat for native wildlife without native plants. Nor would guests be attracted to the site unless the garden was known for being beautiful. Plants that look similar to those used the most in Japanese gardens are essential for making the visitors feel they have experienced a true Japanese-style garden. The plant substitutions were selected on the basis of a common genus, overall size, bloom color and time, leaf appearance, and other interesting aesthetic qualities such as bark, in that order. Given that so many of the pairings are striking similar, it is highly likely that the plants chosen for this project will provide a sound starting point for the rest of the garden design.

Japanese gardens are popular throughout the world and usually include plant species native to Japan, regardless of where the gardens are installed. However, plants used outside of their native region can become invasive, killing local flora, costing millions of dollars in remediation, and contributing little to the local ecosystem. Incorporating native plants has become more common in landscape architecture because of environmental concerns such as increased

climate change; air, soil, and water pollution; the die-off of bees and other pollinators, and lack of natural habitat due to urban sprawl.

This project, a Japanese-style garden in Columbus, Indiana, would use only plants native to southern Indiana. The native plants used will be analogous in terms of form and habitat to the most commonly used plants from Japanese gardens in Japan itself. The nine-acre site in Columbus was chosen for its ease of access, location near the interchange of a highway and interstate, and proximity to several Japanese-owned companies. Finally, Columbus is well-known for its many sites of architectural and landscape architectural interest. Therefore, the addition of a large Japanese-style garden to the city would fit well within the history and culture of Columbus.



Source: Lisa Dunaway.

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APPENDIX

Japanese^{1,2}



Photo: c1.staticflickr.com

Pinus parviflora
Japanese White Pine

五葉松 / Goyomatsu

Evergreen

Height: 20.00 to 40.00 feet

Spread: 20.00 to 50.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun

Water: Medium

Source: missouribotanicalgarden.org

Indiana^{3,4,5}



Photo: wildflower.org

Pinus virginiana
Virginia Pine

Evergreen

Height: 15.00 to 30.00 feet

Spread: 10.00 to 20.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun

Water: Medium

Source: missouribotanicalgarden.org

¹ Walker, Sophie. 2017. "The Japanese Garden." London: Phaidon Press.

² Levy, Ran. 2004. "Garden Plants of Japan." Portland: Timber Press.

³ "Gordon Mitchell's Plant Profiles." 2018. Indiana Native Plant and Wildflower Society. <http://www.inpaws.org/native-plants>

⁴ "Native Plants of Indiana." 2018. Indiana Wildlife Federation. <https://www.indianawildlife.org/wildlife/native-plants/#Shrubs>

⁵ "Wildflowers of Indiana." 2018. US Wildflowers. <https://uswildflowers.com/>



Photo: store.belgravia-garden.com

Pinus koraiensis

Korean Pine

チョウセンゴヨウ / Chosenmatsu

Evergreen

Height: 30.00 to 50.00 feet

Spread: 25.00 to 35.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun

Water: Medium

Source: missouribotanicalgarden.org



Photo: Missouri Botanical Garden

Pinus strobus

White Pine

Evergreen

Height: 50.00 to 80.00 feet

Spread: 20.00 to 40.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun to part shade

Water: Medium

Source: missouribotanicalgarden.org



Photo: www.planfor.co.uk

Pinus thunbergii
Japanese Black Pine

黒松 / Kuromatsu

Evergreen

Height: 20.00 to 60.00 feet

Spread: 12.00 to 20.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun

Water: Medium

Source: missouribotanicalgarden.org



Photo: orientalgardensupply.com

Pinus virginiana
Virginia Pine

Evergreen

Height: 15.00 to 30.00 feet

Spread: 10.00 to 20.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun

Water: Medium

Maintenance: Low

Source: missouribotanicalgarden.org



Photo: cdn.shopify.com/s/files/1/0200/5036/products/01908-01_2048x2048.jpeg?v=1421748486

Chamaecyparis obtusa

Hinoki Cypress

檜 or 桧 / Hinoki

Evergreen

Height: 50.00 to 75.00 feet

Spread: 15.00 to 25.00 feet

Bloom Time: Non-flowering

Sun: Full sun to part shade

Water: Medium

Source: missouribotanicalgarden.org



en.wikipedia.org/wiki/Juniperus_virginiana

Juniperus virginiana

Eastern Red Cedar

Evergreen

Height: 30.00 to 65.00 feet

Spread: 8.00 to 25.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun

Water: Dry to medium

Source: missouribotanicalgarden.org



Photo: Sunset Magazine

Abelia × grandiflora
Glossy Abelia

Semi-evergreen or evergreen

Height: 3.00 to 6.00 feet

Spread: 3.00 to 6.00 feet

Bloom Time: May to September

Bloom Description: White/flushed pink

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Hedge, Naturalize

Flower: Showy, Fragrant

Leaf: Good Fall

Tolerate: Erosion

Source: missouribotanicalgarden.org



Photo: Learn2Grow

Hibiscus moscheutos
Swamp Marsh Mallow or Hardy Hibiscus

Deciduous

Height: 2.00 to 3.00 feet

Spread: 1.50 to 2.00 feet

Bloom Time: July to September

Bloom Description: Deep burgundy [sic] red

Sun: Full sun

Water: Medium to wet

Maintenance: Low

Suggested Use: Rain Garden

Flower: Showy

Attracts: Butterflies

Tolerate: Deer, Wet Soil

Source: missouribotanicalgarden.org



Photo: Abies firma

Abies firma

Momi or Japanese Fir

縦 / Momi

Evergreen

Height: 40.00 to 60.00 feet

Spread: 30.00 to 50.00 feet

Bloom Time: Non-flowering

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Leaf: Fragrant, Evergreen

Other: Winter Interest

Tolerate: Clay Soil

Source: missouribotanicalgarden.org



Photo: Tree Seed Online Ltd

Abies balsamea

Balsam Fir

Evergreen

Height: 50.00 to 70.00 feet

Spread: 15.00 to 25.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Leaf: Fragrant, Evergreen

Other: Winter Interest

Source: missouribotanicalgarden.org



Photo: Asian flora

Betula mandshurica var. *japonica*
Japanese White Birch

白樺 / Shirakaba

Deciduous

Height: up to 75.00 feet

Bloom Time: Spring

Bloom Description: Reddish, female are catkins

Sun: Full sun

Maintenance: does not tolerate pruning

Suggested Use: Parks and gardens, road tree

Flower: large

Leaf: Good fall, yellow

Tolerate: Cool climate

Source: Ran Levy



Photo: Under the Sun Seeds

Betula nigra
River Birch

Deciduous

Height: 40.00 to 70.00 feet

Spread: 40.00 to 60.00 feet

Bloom Time: April to May

Bloom Description: Brown (male) green (female)

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Shade Tree, Rain Garden

Flower: Showy

Other: Winter Interest

Tolerate: Deer, Drought, Clay Soil, Wet Soil, Air

Pollution

Source: missouribotanicalgarden.org



Photo: Wikipedia

Liquidambar formosana
Taiwan fū

Deciduous

Height: 40.00 to 60.00 feet

Spread: 25.00 to 30.00 feet

Bloom Time: April to May

Bloom Description: Yellowish-green

Sun: Full sun

Water: Medium

Maintenance: Low

Suggested Use: Shade Tree

Leaf: Good Fall

Fruit: Showy

Tolerate: Deer

Source: missouribotanicalgarden.org



Photo: Van den Berk Nurseries

Liquidambar styraciflua
Sweet Gum

Deciduous

Height: 60.00 to 80.00 feet

Spread: 40.00 to 60.00 feet

Bloom Time: April to May

Bloom Description: Yellow-green

Sun: Full sun

Water: Medium

Maintenance: Low

Suggested Use: Shade Tree

Leaf: Fragrant, Good Fall

Fruit: Showy

Tolerate: Rabbit, Deer, Clay Soil

Source: missouribotanicalgarden.org



Photo: Plants that Grow in the USA

Myrica rubra

Japanese or Chinese Bayberry

ヤマモモ / Yama momo

Evergreen

Height: 15.00 to 30.00 feet

Spread: 15.00 to 30.00 feet

Bloom Time: Spring

Bloom Description: Small

Sun: Full sun to semi-shade

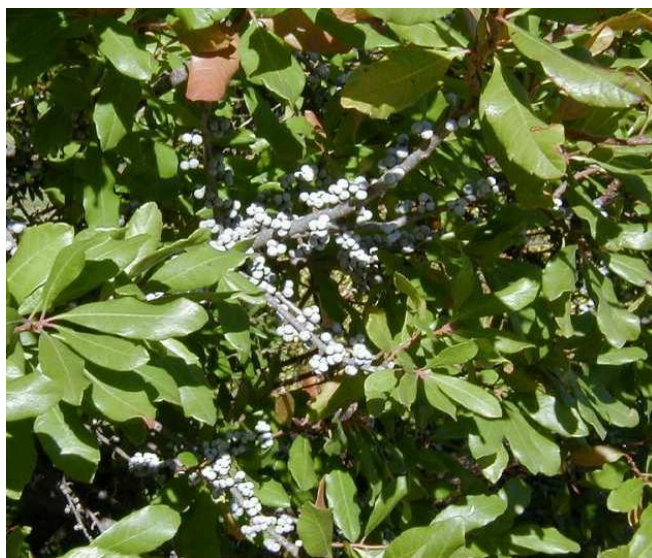
Flower: Female flower is red, male flower is a raceme

Leaf: Shiny

Attracts: Birds

Fruit: Showy, purple to red

Source: Wikipedia, Oregon State, pfaf.org, Ran Levy



Source: missouribotanicalgarden.org

Myrica pensylvanica

Northern Bayberry

Semi-evergreen

Height: 5.00 to 10.00 feet

Spread: 5.00 to 10.00 feet

Bloom Time: May

Bloom Description: Yellowish green (male)

Sun: Full sun to part shade

Water: Dry to medium

Maintenance: Low

Suggested Use: Hedge, Naturalize, Rain Garden

Flower: Insignificant

Leaf: Fragrant

Attracts: Birds

Fruit: Showy

Other: Winter Interest

Tolerate: Drought, Erosion, Wet Soil

Source: missouribotanicalgarden.org



Photo: Wikimedia Commons

Philadelphus satsumi
Satsuma Mock Orange

Baika utsugi

Deciduous

Height: feet

Spread: feet

Bloom Time:

Bloom Description: White

Flower: Showy

Source: Ran Levy



Photo: Plants for a Future

Philadelphus pubescens
Broad-leaf Mock Orange

Deciduous

Height: 4.00 to 10.00 feet

Spread: 4.00 to 10.00 feet

Bloom Time: June to July

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Hedge

Flower: Showy, Fragrant

Tolerate: Rabbit, Deer

Source: missouribotanicalgarden.org



Photo: brest.sk

Photinia glabra

Japanese Photonia

Kaname or Akame mochi

Evergreen

Height: 8.00-12.00 feet

Bloom Description: White, small clusters

Sun: Sun to part shade

Flower: Showy

Leaf: Bronzy-red at emergence, then dark green

Fruit: Red to blackberries

Source: Oregon State



Photo: OMC Seeds

Aronia melanocarpa

Black Chokeberry

Height: 3.00 to 6.00 feet

Spread: 3.00 to 6.00 feet

Bloom Time: May

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Hedge, Naturalize, Rain Garden

Flower: Showy

Leaf: Good Fall

Attracts: Birds

Fruit: Showy, Edible

Source: missouribotanicalgarden.org



Photo: Kurowski

Platycladus orientalis
Oriental Arborvitae or Chinese Arborvitae

Ko-no-tegashiwa

Evergreen

Height: 18.00 to 25.00 feet

Spread: 10.00 to 15.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Hedge

Leaf: Evergreen

Source: missouribotanicalgarden.org



Photo: Thuja Planet

Thuja occidentalis
American Arborvitae

Evergreen

Height: 20.00 to 40.00 feet

Spread: 10.00 to 15.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Leaf: Evergreen

Other: Winter Interest

Tolerate: Clay Soil, Black Walnut, Air Pollution

Source: missouribotanicalgarden.org



Photo: Wikipedia

Prunus jamasakura

Japanese Hill Cherry or Mountain Cherry

Yama zakura or Shiro yama zakura

Deciduous

Height: 26.00 to 39.00 feet

Bloom Description: Pink to white

Fruit: Black drupe

Flower: Showy

Source: Wikipedia



Photo: Go Botany

Prunus serotina

Black Cherry

Deciduous

Height: 50.00 to 80.00 feet

Spread: 30.00 to 60.00 feet

Bloom Time: April to May

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Shade Tree, Flowering Tree

Flower: Showy, Fragrant

Leaf: Good Fall

Attracts: Birds

Fruit: Showy

Source: missouribotanicalgarden.org



Photo: Oregon State

Quercus acutissima

Sawthorn Oak or Chinese Cork Oak

Kunugi

Deciduous

Height: 40.00 to 60.00 feet

Spread: 40.00 to 60.00 feet

Bloom Time: March to April

Bloom Description: Yellowish-green

Sun: Full sun

Water: Medium

Maintenance: Low

Suggested Use: Shade Tree

Flower: Insignificant

Leaf: Good Fall

Fruit: Showy

Tolerate: Drought

Source: missouribotanicalgarden.org



Photo: pfaf.org

Quercus phellos

Willow Oak

Height: 40.00 to 75.00 feet

Spread: 25.00 to 50.00 feet

Bloom Time: April

Bloom Description: Yellow-green

Sun: Full sun

Water: Medium to wet

Maintenance: Low

Suggested Use: Shade Tree, Street Tree, Rain Garden

Flower: Insignificant

Tolerate: Clay Soil, Wet Soil, Air Pollution

Source: missouribotanicalgarden.org



Photo: Oaks of the World

Quercus glauca

Ring-cupper Oak

Ara kashi

Deciduous

Height: 20.00 to 30.00 feet

Spread: 10.00 to 15.00 feet

Bloom Time: April to May

Bloom Description: Yellowish-green

Sun: Full sun

Water: Medium

Maintenance: Low

Suggested Use: Shade Tree, Street Tree

Flower: Insignificant

Leaf: Evergreen

Other: Winter Interest

Source: missouribotanicalgarden.org



Photo: plantplaces.com

Quercus imbricaria

Shingle Oak

Deciduous

Height: 40.00 to 60.00 feet

Spread: 40.00 to 60.00 feet

Bloom Time: April

Bloom Description: Yellowish-green

Sun: Full sun

Water: Medium

Maintenance: Low

Suggested Use: Shade Tree

Flower: Insignificant

Leaf: Good Fall

Fruit: Showy

Tolerate: Drought, Black Walnut

Source: missouribotanicalgarden.org



Source: missouribotanicalgarden.org

Quercus variabilis

Chinese Cork Oak

Abe maki, koroku kunugi, wata kunugi

Deciduous

Height: 75.00 to 90.00 feet

Spread: 60.00 to 75.00 feet

Bloom Time: April to May

Bloom Description: Yellow-green

Sun: Full sun

Water: Dry to medium

Maintenance: Low

Suggested Use: Shade Tree, Street Tree

Flower: Insignificant

Fruit: Showy

Tolerate: Drought, Dry Soil

Source: missouribotanicalgarden.org



Photo: plantplaces.com

Quercus imbricaria

Shingle Oak

Deciduous

Height: 40.00 to 60.00 feet

Spread: 40.00 to 60.00 feet

Bloom Time: April

Bloom Description: Yellowish-green

Sun: Full sun

Water: Medium

Maintenance: Low

Suggested Use: Shade Tree

Flower: Insignificant

Leaf: Good Fall

Fruit: Showy

Tolerate: Drought, Black Walnut

Source: missouribotanicalgarden.org



Photo: Wikimedia Commons

Rhaphiolepis umbellata

Yeddo Hawthorn or Japanese Hawthorn

Sharin bai or tachi sharin bai

Evergreen

Height: 4.00 to 6.00 feet

Spread: 4.00 to 6.00 feet

Bloom Time: April to May

Bloom Description: White to pale pink

Sun: Full sun

Water: Medium

Maintenance: Low

Suggested Use: Hedge

Flower: Showy

Attracts: Birds

Fruit: Showy

Other: Winter Interest

Tolerate: Drought

Source: missouribotanicalgarden.org



Source: missouribotanicalgarden.org

Myrica pensylvanica

Northern Bayberry

Semi-evergreen

Height: 5.00 to 10.00 feet

Spread: 5.00 to 10.00 feet

Bloom Time: May

Bloom Description: Yellowish green (male)

Sun: Full sun to part shade

Water: Dry to medium

Maintenance: Low

Suggested Use: Hedge, Naturalize, Rain Garden

Flower: Insignificant

Leaf: Fragrant

Attracts: Birds

Fruit: Showy

Other: Winter Interest

Tolerate: Drought, Erosion, Wet Soil

Source: missouribotanicalgarden.org



Photo: pepinieredesavettes.com

Castanopsis cuspidata
Japanese Chinquapin

円ら二 / Tsubura ji

Deciduous

Height: up to 75.00 feet

Bloom Time: early summer

Bloom Description: Light yellow

Water: Somewhat moist

Flower: showy

Fruit: edible nut

Source: Ran Levy



Photo: Venerable Trees

Quercus muehlenbergii
Chinakapin Oak

Deciduous

Height: 40.00 to 60.00 feet

Spread: 50.00 to 70.00 feet

Bloom Time: April

Bloom Description: Yellowish-green

Sun: Full sun

Water: Dry to medium

Maintenance: Low

Suggested Use: Shade Tree

Flower: Insignificant

Fruit: Showy

Tolerate: Drought

Source: missouribotanicalgarden.org



Photo: Alamy

*Catalpa ovata**
Chinese Catalpa or Yellow Bean Tree

Deciduous

Height: 20.00 to 30.00 feet

Spread: 20.00 to 30.00 feet

Bloom Time: May to June

Bloom Description: Yellowish-white

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Medium

Suggested Use: Shade Tree

Flower: Showy

Fruit: Showy

Tolerate: Deer

Source: missouribotanicalgarden.org



Photo: NC State University

Catalpa speciosa
Catalpa

Deciduous

Height: 40.00 to 70.00 feet

Spread: 20.00 to 50.00 feet

Bloom Time: May to June

Bloom Description: White with purple and yellow
interior spotting

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Medium

Suggested Use: Shade Tree, Rain Garden

Flower: Showy

Fruit: Showy

Tolerate: Deer, Drought, Clay Soil, Air Pollution

Source: missouribotanicalgarden.org

*Naturalized in Japan; native to southern China



Photo: Barcham Tree Ltd

Acer buergerianum
Trident Maple

唐楓 / Tōkaede

Height: 20.00 to 30.00 feet

Spread: 20.00 to 30.00 feet

Bloom Time: April to May

Bloom Description: Greenish-yellow

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Shade Tree, Street Tree

Flower: Insignificant

Leaf: Good Fall

Tolerate: Air Pollution

Source: missouribotanicalgarden.org



Photo: moneden.fr

Acer rubrum
Red Maple

Deciduous

Height: 40.00 to 70.00 feet

Spread: 30.00 to 50.00 feet

Bloom Time: March to April

Bloom Description: Red, sometimes yellow

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Shade Tree, Street Tree, Rain
Garden

Flower: Showy

Leaf: Good Fall

Tolerate: Wet Soil, Air Pollution

Source: missouribotanicalgarden.org



Photo: Lisa Dunaway

Taxus cuspidata

Japanese Yew

一位 / Ichii

Evergreen

Height: 4.00 to 6.00 feet

Spread: 5.00 to 7.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun to part shade

Water: Medium

Source: missouribotanicalgarden.org



Photo: Oregon State University

Ilex verticillata

Winterberry

Deciduous shrub

Height: 3.00 to 12.00 feet

Spread: 3.00 to 12.00 feet

Bloom Time: June to July

Bloom Description: Greenish-white

Sun: Full sun to part shade

Water: Medium to wet

Source: missouribotanicalgarden.org



Photo: Architectural Plants

Podocarpus macrophyllus
Yew Plum Pine

犬神 or 犬上 / Inumaki

Evergreen

Height: 20.00 to 40.00 feet

Spread: 10.00 to 20.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun to part shade

Water: Medium

Source: missouribotanicalgarden.org



en.wikipedia.org/wiki/Juniperus_virginiana

Juniperus virginiana

Eastern Red Cedar

Evergreen

Height: 30.00 to 65.00 feet

Spread: 8.00 to 25.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun

Water: Dry to medium

Source: missouribotanicalgarden.org



Photo: Lisa Dunaway

Cinnamomum camphora
Camphor Tree

楠 / Kusunoki

Evergreen

Height: 20.00 to 30.00 feet

Spread: 20.00 to 30.00 feet

Bloom Time: Spring

Bloom Description: Small, white

Sun: Full sun to part shade

Water: High

Source: Wikipedia.org, USDA.gov



Photo: <http://2.bp.blogspot.com>

Fagus grandifolia
American Beech

Deciduous

Height: 50.00 to 80.00 feet

Spread: 40.00 to 80.00 feet

Bloom Time: April to May

Bloom Description: Yellowish-green

Sun: Full sun to part shade

Water: Medium

Source: missouribotanicalgarden.org



Photo: wikimedia.org

Daphniphyllum macropodum

False Daphne

栳 / Yuzuriha

Broadleaf evergreen

Height: 2.00 to 5.00 feet

Spread: 2.00 to 5.00 feet

Bloom Time: May to June

Bloom Description: Purple-pink (male) and pale green (female)

Sun: Part shade

Water: Medium

Maintenance: Medium

Source: missouribotanicalgarden.org



Photo: chy.wikimedia.org

Rhus glabra

Smooth Sumac

Deciduous shrub

Height: 9.00 to 15.00 feet

Spread: 9.00 to 15.00 feet

Bloom Time: June

Bloom Description: Yellowish-green

Sun: Full sun to part shade

Water: Dry to medium

Maintenance: Medium

Source: missouribotanicalgarden.org



Photo: Plant Lust

Dendropanax trifidus
Ivy tree

隠蓑 / Kakuremino

Evergreen (tropical)

Height: 20.00 to 30.00 feet

Spread: 15.00 to 20.00 feet

Source: plantlust.com, davesgarden.com,
southeastgarden.com



Photo: Murrysville Recreation

Carpinus caroliniana
American Hornbeam

Height: 20.00 to 35.00 feet

Spread: 20.00 to 35.00 feet

Bloom Time: February

Bloom Description: White (female), Green (male)

Sun: Part shade to full shade

Water: Medium

Maintenance: Low

Suggested Use: Street Tree, Naturalize

Flower: Insignificant

Leaf: Good Fall

Tolerate: Clay Soil

Source: missouribotanicalgarden.org



Photo: Missouri Botanical Garden

*Ginkgo biloba**

Maidenhair Tree

銀杏 / Icho

Deciduous

Height: 50.00 to 80.00 feet

Spread: 30.00 to 40.00 feet

Bloom Time: April

Bloom Description: Green

Sun: Full sun

Water: Medium

Source: missouribotanicalgarden.org



Photo: GoBotany

Sassafras albidum

Sassafras Tree

Deciduous

Height: 30.00 to 60.00 feet

Spread: 25.00 to 40.00 feet

Bloom Time: April to May

Bloom Description: Greenish-yellow

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Flowering Tree

Flower: Showy

Fruit: Showy

Tolerate: Deer, Drought, Clay Soil

Source: missouribotanicalgarden.org

*Naturalized in Japan: native to China.



Photo: wikimedia.org

Acer palmatum
Japanese Maple

イロハモミジ or 紅葉 / Irohamomiji

Deciduous

Height: 10.00 to 25.00 feet

Spread: 10.00 to 25.00 feet

Bloom Time: April

Bloom Description: Reddish-purple

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Flower: Insignificant

Leaf: Good Fall

Source: missouribotanicalgarden.org



Photo: americanmeadows.com

Sambucus canadensis
American Black Elderberry

Deciduous

Height: 5.00 to 12.00 feet

Spread: 5.00 to 12.00 feet

Bloom Time: June to July

Bloom Description: White

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: High

Suggested Use: Hedge, Naturalize, Rain Garden

Flower: Showy

Attracts: Birds, Butterflies

Fruit: Showy, Edible

Source: missouribotanicalgarden.org



Photo: Oregon State University

Acer japonicum

Japanese or Full Moon Maple

羽团扇枫 / Hauchiwa kaede

Deciduous

Height: 20.00 to 30.00 feet

Spread: 20.00 to 30.00 feet

Bloom Time: April

Bloom Description: Purplish red

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Flower: Showy

Leaf: Good Fall

Source: missouribotanicalgarden.org



Photo: moneden.fr

Acer rubrum

Red Maple

Deciduous

Height: 40.00 to 70.00 feet

Spread: 30.00 to 50.00 feet

Bloom Time: March to April

Bloom Description: Red, sometimes yellow

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Shade Tree, Street Tree, Rain Garden

Flower: Showy

Leaf: Good Fall

Tolerate: Wet Soil, Air Pollution

Source: missouribotanicalgarden.org



Photos: www.cirrusimage.com

Aesculus turbinata
Japanese Horse Chestnut

栂の木 / Tochinoki

Deciduous

Height: 60.00-90.00 feet

Spread: ~40.00 feet

Bloom Time: Late spring to early summer

Bloom Description: Yellowish with red variations

Sun: Full sun to part shade

Water: Medium, well-drained

Maintenance: Low

Flower: Showy

Leaf: Palmately compound

Source: Ran Levy, pfaf.org



Photo: Oregon State University

Aesculus glabra
Ohio Buckeye

Deciduous

Height: 20.00 to 40.00 feet

Spread: 20.00 to 40.00 feet

Bloom Time: April to May

Bloom Description: Greenish-yellow

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Rain Garden

Flower: Showy, Fragrant

Leaf: Fragrant, Good Fall

Attracts: Butterflies

Fruit: Showy

Tolerate: Rabbit

Source: missouribotanicalgarden.org



Photo: UFEL - SelecTree: A Tree Selection Guide

Albizia julibrissin
Silk Tree or Pink Siris

合歡木 / Nemunoki

Height: 20.00 to 40.00 feet

Spread: 20.00 to 50.00 feet

Bloom Time: June to July

Bloom Description: Pink

Sun: Full sun to part shade

Water: Medium

Maintenance: High

Suggested Use: Flowering Tree

Flower: Showy

Attracts: Butterflies

Tolerate: Deer, Drought

Source: missouribotanicalgarden.org



Photo: SmartSeeds

Cercis canadensis
Eastern Redbud

Deciduous

Height: 20.00 to 30.00 feet

Spread: 25.00 to 35.00 feet

Bloom Time: April

Bloom Description: Pink

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Street Tree, Flowering Tree,
Naturalize

Flower: Showy

Leaf: Good Fall

Attracts: Butterflies

Tolerate: Deer, Clay Soil, Black Walnut

Source: missouribotanicalgarden.org



Photo: Wikipedia

Celtis sinensis

Japanese or Chinese Hackberry

えのき / Enoki

Deciduous

Height: 15.00 to 20.00 feet

Spread: 15.00 to 20.00 feet

Bloom Time: March to May

Bloom Description: Greenish

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Naturalize

Flower: Insignificant

Leaf: Good Fall

Attracts: Birds

Fruit: Showy

Tolerate: Drought

Source: missouribotanicalgarden.org



Photo: CalPoly

Celtis occidentalis

Common Hackberry

Deciduous

Height: 40.00 to 60.00 feet

Spread: 40.00 to 60.00 feet

Bloom Time: April to May

Bloom Description: Green

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Shade Tree, Street Tree, Rain Garden

Flower: Insignificant

Attracts: Birds, Butterflies

Fruit: Edible

Tolerate: Drought, Clay Soil, Wet Soil, Air Pollution

Source: missouribotanicalgarden.org



Photo: garten.cz

Cercidiphyllum japonicum
Katsura Tree

桂 / Katsura

Height: 40.00 to 60.00 feet

Spread: 25.00 to 60.00 feet

Bloom Time: March to April

Bloom Description: Green to reddish-green

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Shade Tree

Flower: Insignificant

Leaf: Good Fall

Tolerate: Clay Soil

Source: missouribotanicalgarden.org



©2009 Will Cook

Photo: Carolina Nature

Cercis canadensis
Eastern Redbud

Deciduous

Height: 20.00 to 30.00 feet

Spread: 25.00 to 35.00 feet

Bloom Time: April

Bloom Description: Pink

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Street Tree, Flowering Tree,
Naturalize

Flower: Showy

Leaf: Good Fall

Attracts: Butterflies

Tolerate: Deer, Clay Soil, Black Walnut

Source: missouribotanicalgarden.org



Photo: Concepto de Jardin

*Salix babylonica**
Weeping Willow

枝垂柳 / Shidareyanag

Height: 30.00 to 50.00 feet

Spread: 30.00 to 50.00 feet

Bloom Time: April to May

Bloom Description: Silver green

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Medium

Source: missouribotanicalgarden.org



Photo: Great Plains Nursery

Salix nigra
Black Willow

Height: 30.00 to 60.00 feet

Spread: 30.00 to 60.00 feet

Bloom Time: March to April

Bloom Description: Yellowish-green

Sun: Full sun to part shade

Water: Medium to wet

Source: missouribotanicalgarden.org

*Walker lists this tree as a Japanese native but Missouri Botanical Garden and others list it as introduced: native to China.



Photo: Singing Tree Gardens

*Magnolia denudata**

Yulan Magnolia or Lily Tree

白木蓮 / Hakumokuren

Deciduous

Height: 30.00 to 40.00 feet

Spread: 30.00 to 40.00 feet

Bloom Time: March

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Source: missouribotanicalgarden.org



Photo: thetreecenter.com

Magnolia grandiflora

Southern Magnolia

Deciduous

Height: 60.00 to 80.00 feet

Spread: 30.00 to 50.00 feet

Bloom Time: May to June

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Source: missouribotanicalgarden.org

*Naturalized in Japan: native to China.



mar13n

Photo: North American Insects and Spiders

Magnolia kobus

Kobus Magnolia

辛夷 / Kobushi

Deciduous

Height: 25.00 to 30.00 feet

Spread: 25.00 to 35.00 feet

Bloom Time: March to April

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Source: missouribotanicalgarden.org



Photo: Hunker

Magnolia tripetala

Cucumbertree Magnolia

Deciduous

Height: 15.00 to 30.00 feet

Spread: 15.00 to 30.00 feet

Bloom Time: May

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Source: missouribotanicalgarden.org



Photo: Alamy

Wisteria floribunda

Japanese Wisteria

藤 / Noda fuji

Deciduous twining climber

Height: 20.00 to 25.00 feet

Spread: 4.00 to 8.00 feet

Bloom Time: May

Bloom Description: Bluish purple

Sun: Full sun

Water: Medium

Source: missouribotanicalgarden.org



Photo: Alan Cressler

Clematis viorna

Vasevine or Leatherflower

Deciduous vine

Height: 6.00 to 10.00 feet

Spread: --

Bloom Time: May to fall

Bloom Description: Purple

Sun: Full sun to partial shade

Other: Toxic

Source: plants.ces.ncsu.edu



Photo: AliExpress.com

*Prunus mume**
Japanese Apricot or Chinese Plum

梅 / Ume

Deciduous

Height: 15.00 to 20.00 feet

Spread: 15.00 to 20.00 feet

Bloom Time: February to March

Bloom Description: Pink

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Flowering Tree

Flower: Showy, Fragrant

Fruit: Showy, Edible

Other: Winter Interest

Source: missouribotanicalgarden.org



Photo: SmartSeeds

Cercis canadensis
Eastern Redbud

Deciduous

Height: 20.00 to 30.00 feet

Spread: 25.00 to 35.00 feet

Bloom Time: April

Bloom Description: Pink

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Street Tree, Flowering Tree,

Naturalize

Flower: Showy

Leaf: Good Fall

Attracts: Butterflies

Tolerate: Deer, Clay Soil, Black Walnut

Source: missouribotanicalgarden.org

*Introduced to Japan; native to China.



Photo: Forestry Images

*Malus halliana**
Hall Crabapple

伊達巻 / Hanakaido

Deciduous

Height: 10-15'

Bloom Time: May

Bloom Description: White, fragrant

Sun: Part or full sun

Water: Well-drained soil, moist

Suggested Use:

Flower: Showy, Fragrant

Fruit: edible

Other: Toxic, Dioecious

Source: missouribotanicalgarden.org



Photo: Flora of Wisconsin

Malus coronaria
Sweet Crabapple

Deciduous

Height: 30'

Bloom time: May-June

Bloom Description:

Water: Moist

Maintenance: Can become gnarly

Suggested Use:

Flower: Light pink, fragrant

Fruit: October, fragrant, not edible

Source: Wikipedia.org

* Some sources say this is native to Japan and was introduced to China. Some say the opposite.



Proven Winners ColorChoice
Photo: houzz.co.nz

*Chaenomeles speciosa**
Chinese Quince

木瓜 / Boke

Deciduous

Height: 6.00 to 10.00 feet

Spread: 6.00 to 10.00 feet

Bloom Time: March to April

Bloom Description: Scarlet to red

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Hedge

Flower: Showy

Fruit: Showy, Edible

Other: Thorns

Tolerate: Drought, Clay Soil

Source: missouribotanicalgarden.org



Photo: Learn2Grow

Hibiscus moscheutos
Swamp Marsh Mallow or Hardy Hibiscus

Deciduous

Height: 2.00 to 3.00 feet

Spread: 1.50 to 2.00 feet

Bloom Time: July to September

Bloom Description: Deep burgundy [sic] red

Sun: Full sun

Water: Medium to wet

Maintenance: Low

Suggested Use: Rain Garden

Flower: Showy

Attracts: Butterflies

Tolerate: Deer, Wet Soil

Source: missouribotanicalgarden.org

*Walker states this plant is native to Japan, however, other sources like UConn.edu say it's native to China.



Photo: Plantinfo

*Diospyros kaki**
Japanese Persimmon

柿 / Kaki

Deciduous

Height: 20.00 to 30.00 feet

Spread: 20.00 to 30.00 feet

Bloom Time: May to June

Bloom Description: Creamy white (female) Pink (male)

Sun: Full sun

Water: Medium

Maintenance: Low

Suggested Use: Naturalize

Flower: Insignificant

Leaf: Good Fall

Fruit: Showy, Edible

Other: Winter Interest

Source: missouribotanicalgarden.org



Photo: UConn Plant Database

Diospyros virginiana
American Persimmon

Deciduous

Height: 35.00 to 60.00 feet

Spread: 25.00 to 35.00 feet

Bloom Time: May to June

Bloom Description: White to greenish yellow

Sun: Full sun to part shade

Water: Dry to medium

Maintenance: Low

Suggested Use: Rain Garden

Flower: Insignificant

Fruit: Showy, Edible

Other: Winter Interest

Tolerate: Drought, Clay Soil, Dry Soil, Shallow-Rocky

Soil, Air Pollution

Source: missouribotanicalgarden.org

*Naturalized in Japan.



Photo: Wordpress.com

*Camellia sinensis**

Tea Plant

茶の木 / Tea Plant

Evergreen (shrub or small tree)

Height: 10.00 to 15.00 feet

Spread: 6.00 to 10.00 feet

Bloom Time: October to December

Bloom Description: White

Sun: Part shade

Water: Medium

Maintenance: Medium

Suggested Use: Hedge

Flower: Showy, Fragrant

Leaf: Evergreen

Other: Winter Interest

Source: missouribotanicalgarden.org



Photo: Oregon State University

Ilex verticillata

Winterberry

Deciduous shrub

Height: 3.00 to 12.00 feet

Spread: 3.00 to 12.00 feet

Bloom Time: June to July

Bloom Description: Greenish-white

Sun: Full sun to part shade

Water: Medium to wet

Source: missouribotanicalgarden.org

*Naturalized in Japan.



Photo: Oregon State University

Camellia japonica
Camellia

椿 / Tsubaki

Evergreen

Height: 7.00 to 12.00 feet

Spread: 5.00 to 10.00 feet

Bloom Time: Seasonal bloomer

Bloom Description: white, pink, red, yellow, and
lavender

Sun: Part shade

Water: Medium

Maintenance: Medium

Flower: Showy

Source: missouribotanicalgarden.org



Photo: Learn2Grow

Hibiscus moscheutos
Swamp Marsh Mallow or Hardy Hibiscus

Height: 2.00 to 3.00 feet

Spread: 1.50 to 2.00 feet

Bloom Time: July to September

Bloom Description: Deep burgundy [sic] red

Sun: Full sun

Water: Medium to wet

Maintenance: Low

Suggested Use: Rain Garden

Flower: Showy

Attracts: Butterflies

Tolerate: Deer, Wet Soil

Source: missouribotanicalgarden.org



Photo: NC State University

Osmanthus fragrans
Fragrant Olive

木犀 / Nishikigi

Evergreen

Height: 10.00 to 15.00 feet

Spread: 10.00 to 15.00 feet

Bloom Time: April

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Flowering Tree

Flower: Showy, Fragrant

Leaf: Evergreen

Other: Winter Interest

Tolerate: Drought, Clay Soil

Source: missouribotanicalgarden.org



Photo: Oregon State University

Ilex verticillata

Winterberry

Deciduous shrub

Height: 3.00 to 12.00 feet

Spread: 3.00 to 12.00 feet

Bloom Time: June to July

Bloom Description: Greenish-white

Sun: Full sun to part shade

Water: Medium to wet

Source: missouribotanicalgarden.org



Photo: NC State University

Ilex crenata

Japanese Holly

犬黄楊 / Inutsuge

Evergreen

Height: 5.00 to 10.00 feet

Spread: 5.00 to 8.00 feet

Bloom Time: May to June

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Hedge

Flower: Showy

Leaf: Evergreen

Other: Winter Interest

Tolerate: Deer, Clay Soil, Air Pollution

Source: missouribotanicalgarden.org



Photo: Oregon State University

Ilex verticillata

Winterberry

Deciduous shrub

Height: 3.00 to 12.00 feet

Spread: 3.00 to 12.00 feet

Bloom Time: June to July

Bloom Description: Greenish-white

Sun: Full sun to part shade

Water: Medium to wet

Source: missouribotanicalgarden.org



Photo: Wikimedia Commons

Ilex serrata

Winterberry

梅擬 / Umemodoki

Deciduous

Height: 6.00 to 8.00 feet

Spread: 6.00 to 8.00 feet

Bloom Time: June to July

Bloom Description: White

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Hedge, Rain Garden

Flower: Insignificant

Attracts: Birds

Fruit: Showy

Other: Winter Interest

Tolerate: Erosion, Clay Soil, Wet Soil, Air Pollution

Source: missouribotanicalgarden.org



Photo: Oregon State University

Ilex verticillata

Winterberry

Deciduous shrub

Height: 3.00 to 12.00 feet

Spread: 3.00 to 12.00 feet

Bloom Time: June to July

Bloom Description: Greenish-white

Sun: Full sun to part shade

Water: Medium to wet

Source: missouribotanicalgarden.org



Photo: Wikimedia Commons

Euonymus alatus

Burning Bush

錦木 / Nishikigi

Deciduous

Height: 9.00 to 11.00 feet

Spread: 9.00 to 11.00 feet

Bloom Time: May to June

Bloom Description: Yellow/green

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Hedge

Flower: Insignificant

Leaf: Good Fall

Tolerate: Clay Soil, Black Walnut

Source: missouribotanicalgarden.org



Photo: Wikimedia Commons

Euonymus atropurpureus

Eastern Wahoo!

Height: 12.00 to 20.00 feet

Spread: 15.00 to 25.00 feet

Bloom Time: June

Bloom Description: Dk. purple

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Rain Garden

Leaf: Good Fall

Attracts: Birds

Fruit: Showy

Tolerate: Black Walnut

Source: missouribotanicalgarden.org



Photo: PlantMaster

Pittosporum tobira
Japanese Pittosporum

屏 / Tobera

Evergreen

Height: 10.00 to 15.00 feet

Spread: 10.00 to 15.00 feet

Bloom Time: April to May

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Hedge

Flower: Showy, Fragrant

Leaf: Evergreen

Fruit: Showy

Other: Winter Interest, somewhat tropical

Tolerate: Drought

Source: missouribotanicalgarden.org



Photo: Wilson Nurseries

Viburnum prunifolium
Blackhaw Viburnum

Height: 12.00 to 15.00 feet

Spread: 6.00 to 12.00 feet

Bloom Time: May to June

Bloom Description: White

Sun: Full sun to part shade

Water: Dry to medium

Maintenance: Low

Suggested Use: Hedge

Flower: Showy

Leaf: Good Fall

Attracts: Birds, Butterflies

Fruit: Showy, Edible

Tolerate: Drought, Clay Soil, Black Walnut, Air

Pollution

Source: missouribotanicalgarden.org



Photo: Roses and Gargoyles Gardenscapes

Fatsia japonica

Paperplant

八手 / Yatsude

Evergreen

Height: 6.00 to 16.00 feet

Spread: 6.00 to 16.00 feet

Bloom Time: Seasonal bloomer

Bloom Description: Creamy white

Sun: Part shade to full shade

Water: Medium

Maintenance: Low

Suggested Use: Hedge

Flower: Showy

Leaf: Evergreen

Fruit: Showy

Tolerate: Heavy Shade

Source: missouribotanicalgarden.org



Photo: Wikimedia Commons

Hydrangea quercifolia

Mapleleaf Viburnum

Deciduous

Height: 6.00 to 8.00 feet

Spread: 6.00 to 8.00 feet

Bloom Time: May to July

Bloom Description: White changing to purplish pink

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Hedge, Naturalize

Flower: Showy, Good Cut, Good Dried

Leaf: Good Fall

Other: Winter Interest

Source: missouribotanicalgarden.org



Photo: Whitelea Nurseries

Sasa palmata

Bamboo

笹 / Sasa

Evergreen

Height: 6-10'

Spread: rhizomes, aggressive

Maintenance: moderate, easy to escape

Suggested Use: next to water

Leaf: 2-4" wide and up to 14" long

Other: slightly tropical

Source: bamboogarden.com,

architecturalplants.com



Photo: UFEI

Corylus americana

American Hazelnut or Filbert

Height: 10.00 to 16.00 feet

Spread: 8.00 to 13.00 feet

Bloom Time: March to April

Bloom Description: Male - brown, female - red

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Hedge

Flower: Showy

Leaf: Good Fall

Fruit: Edible

Tolerate: Clay Soil

Source: missouribotanicalgarden.org



Photo: Amazon.com

*Phyllostachys edulis**
Tortoise Shell Bamboo

竹 / Take

Evergreen

Height: 25.00 to 60.00 feet

Spread: 10.00 to 25.00 feet

Bloom Time: Rarely flowers

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Hedge, Naturalize

Leaf: Evergreen

Other: Winter Interest, slightly tropical

Source: missouribotanicalgarden.org



Photo: Missouri Botanical Garden

Liriodendron tulipifera
Tulip Tree

Deciduous

Height: 60.00 to 90.00 feet

Spread: 30.00 to 50.00 feet

Bloom Time: May to June

Bloom Description: Yellow with orange band at
petal bases

Sun: Full sun

Water: Medium

Source: missouribotanicalgarden.org

* Naturalized in Japan



Photo: Missouri Botanical Garden

Cycas revoluta

Palm or Cycad

蘇鉄 / Sotetsu

Evergreen

Height: 3.00 to 10.00 feet

Spread: 3.00 to 10.00 feet

Bloom Time: Non-flowering

Bloom Description: non-flowering

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Leaf: Evergreen

Other: Winter Interest, tropical

Tolerate: Drought

Source: missouribotanicalgarden.org



Photo: Go Botany

Matteuccia struthiopteris

Ostrich Fern

Deciduous

Height: 3.00 to 6.00 feet

Spread: 5.00 to 8.00 feet

Bloom Time: Non-flowering

Sun: Part shade to full shade

Water: Medium to wet

Maintenance: Medium

Suggested Use: Naturalize, Rain Garden

Tolerate: Rabbit, Heavy Shade, Erosion, Clay Soil,

Wet Soil

Source: missouribotanicalgarden.org



Photo: RHS

Stachyurus praecox

Early Spiketail

木五倍子 / Kibushi

Deciduous

Height: 4.00 to 10.00 feet

Spread: 3.00 to 8.00 feet

Bloom Time: March to April

Bloom Description: Yellow-green

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Flower: Showy

Other: Winter Interest

Source: missouribotanicalgarden.org



Photo: Minnesota Wildflowers

Cornus sericea

Red Twig Dogwood

Deciduous

Height: 6.00 to 9.00 feet

Spread: 7.00 to 10.00 feet

Bloom Time: May to June

Bloom Description: White

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Medium

Suggested Use: Hedge, Rain Garden

Flower: Showy

Leaf: Good Fall

Attracts: Birds, Butterflies

Fruit: Showy

Other: Winter Interest

Tolerate: Deer, Erosion, Clay Soil, Wet Soil

Source: missouribotanicalgarden.org



Photo: Siclout

Hamamelis japonica
Japanese Witch Hazel

満作 / Mansaku

Deciduous

Height: 10.00 to 15.00 feet

Spread: 10.00 to 15.00 feet

Bloom Time: January to March

Bloom Description: Yellow

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Hedge

Flower: Showy, Fragrant

Leaf: Good Fall

Other: Winter Interest

Tolerate: Deer, Erosion, Clay Soil

Source: missouribotanicalgarden.org



Photo: New England Wildflower Society

Hamamelis virginiana
Common Witch Hazel

Deciduous

Height: 15.00 to 20.00 feet

Spread: 15.00 to 20.00 feet

Bloom Time: October to December

Bloom Description: Yellow sometimes tinged with orange or red

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Hedge, Naturalize, Rain Garden

Flower: Showy, Fragrant

Leaf: Good Fall

Other: Winter Interest

Tolerate: Deer, Erosion, Clay Soil

Source: missouribotanicalgarden.org



Photo: nurseryguides.com

Cornus kousa
Kousa Dogwood

山法師 / Yamaboshi

Deciduous

Height: 15.00 to 30.00 feet

Spread: 15.00 to 30.00 feet

Bloom Time: May to June

Bloom Description: White to pinkish (bracts)

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Street Tree, Flowering Tree

Flower: Showy

Leaf: Good Fall

Attracts: Butterflies

Fruit: Showy, Edible

Tolerate: Deer

Source: missouribotanicalgarden.org



Photo: amazon.com

Cornus florida
Flowering Dogwood

Deciduous

Height: 15.00 to 30.00 feet

Spread: 15.00 to 30.00 feet

Bloom Time: April to May

Bloom Description: White (bracts)

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Flowering Tree

Flower: Showy

Leaf: Good Fall

Attracts: Birds, Butterflies

Fruit: Showy

Tolerate: Deer, Clay Soil, Black Walnut

Source: missouribotanicalgarden.org



Photo: eBay

Lagerstroemia indica
Crape Myrtle

百日紅 / Sarsuberi

Deciduous

Height: 6.00 to 25.00 feet

Spread: 6.00 to 20.00 feet

Bloom Time: July to September

Bloom Description: Rose to red

Sun: Full sun

Water: Medium

Maintenance: Medium

Flower: Showy, good cut

Leaf: Good Fall

Tolerate: Drought, Clay Soil, Air Pollution

Source: missouribotanicalgarden.org



Photo: SmartSeeds

Cercis canadensis
Eastern Redbud

Deciduous

Height: 20.00 to 30.00 feet

Spread: 25.00 to 35.00 feet

Bloom Time: April

Bloom Description: Pink

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Street Tree, Flowering Tree,

Naturalize

Flower: Showy

Leaf: Good Fall

Attracts: Butterflies

Tolerate: Deer, Clay Soil, Black Walnut

Source: missouribotanicalgarden.org



Photo: Arizona State University

*Photinia glabra**
Japanese Photinia

要躑 / Kanamemochi

Evergreen

Height: 10.00 to 12.00 feet

Spread: 6.00 to 10.00 feet

Bloom Time: Mid-spring

Bloom Description: White

Sun: Full sun to part shade

Water: Medium, well-drained

Maintenance: Low?

Suggested Use: hedge, topiary

Leaf: red fall color

Tolerate: offensive odor

Source: plants.ces.ncsu.edu/plants/all/photinia-glabra



Photo: Van den Berk Nurseries

Rhus typhina
Staghorn Sumac

Deciduous

Height: 15.00 to 25.00 feet

Spread: 20.00 to 30.00 feet

Bloom Time: June to July

Bloom Description: Greenish-yellow

Sun: Full sun to part shade

Water: Dry to medium

Maintenance: Medium

Suggested Use: Naturalize

Flower: Showy

Leaf: Good Fall

Attracts: Birds

Fruit: Showy

Other: Winter Interest

Tolerate: Rabbit, Drought, Erosion, Dry Soil, Shallow-Rocky Soil, Black Walnut

Source: missouribotanicalgarden.org

* Walker lists this as native to Japan but other sources say Western China.

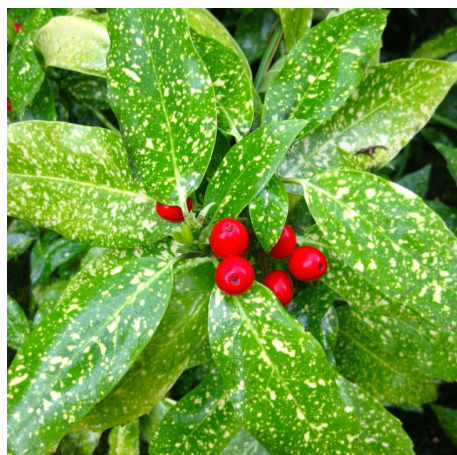


Photo: Coblands

Aucuba japonica
Spotted Laurel

青木 / Aoki

Evergreen

Height: 6.00 to 10.00 feet

Spread: 5.00 to 9.00 feet

Bloom Time: March to April

Bloom Description: Reddish-purple

Sun: Part shade to full shade

Water: Medium

Maintenance: Low

Suggested Use: Hedge

Flower: Showy

Leaf: Evergreen

Fruit: Showy

Other: Winter Interest, Dioecious, somewhat tropical

Tolerate: Heavy Shade, Clay Soil, Air Pollution

Source: missouribotanicalgarden.org



Photo: Missouri Plants

Lindera benzoin
Northern Spicebush

Deciduous

Height: 6.00 to 12.00 feet

Spread: 6.00 to 12.00 feet

Bloom Time: March

Bloom Description: Greenish yellow

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Hedge, Rain Garden

Flower: Showy, Fragrant

Leaf: Fragrant, Good Fall

Attracts: Birds, Butterflies

Fruit: Showy

Tolerate: Deer, Drought, Heavy Shade, Clay Soil

Source: missouribotanicalgarden.org



Photo: gardeningexpress.co.uk

Nandina domestica
Nandina or Sacred Bamboo

南天 / Nanten

Evergreen

Height: 3.00 to 8.00 feet

Spread: 2.00 to 4.00 feet

Bloom Time: June

Bloom Description: White with yellow anthers

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Hedge, Naturalize

Flower: Showy

Leaf: Good Fall

Fruit: Showy

Other: Winter Interest

Tolerate: Drought, Heavy Shade

Source: missouribotanicalgarden.org



Photo: OMC Seeds

Aronia melanocarpa
Black Chokeberry

Deciduous

Height: 3.00 to 6.00 feet

Spread: 3.00 to 6.00 feet

Bloom Time: May

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Hedge, Naturalize, Rain Garden

Flower: Showy

Leaf: Good Fall

Attracts: Birds

Fruit: Showy, Edible

Source: missouribotanicalgarden.org



Photo: NC State

Spiraea cantoniensis
Reeve's Spiraea

Kodemari or Sukukake

Deciduous

Height: 4.00 to 6.00 feet

Spread: 3.00 to 5.00 feet

Bloom Time: Spring

Bloom Description: White

Sun: Part shade to full shade

Other: Attracts butterflies

Tolerate: Deer

Source: NC State



Photo: Missouri Botanical Garden

Spiraea alba
Meadowsweet

Deciduous

Height: 3.00 to 4.00 feet

Spread: 3.00 to 4.00 feet

Bloom Time: June to August

Bloom Description: White

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Hedge, Rain Garden

Flower: Showy, good cut

Attracts: Butterflies

Tolerate: Deer, Wet Soil

Source: missouribotanicalgarden.org



Photo: Dave's Garden

Tsuga sieboldii

Japanese Siythern Hemlock or Japanese Hemlock

Tsuga, toga, or toga-matsu

Evergreen

Height: 20.00 to 40.00 feet

Width: 20.00 to 30.00 feet

Sun: Sun to partial shade

Water: Medium, do not over water

Maintenance: Medium

Source: Dave's Garden



Photo: Thuja Planet

Thuja occidentalis

American Arborvitae

Evergreen

Height: 20.00 to 40.00 feet

Spread: 10.00 to 15.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Leaf: Evergreen

Other: Winter Interest

Tolerate: Clay Soil, Black Walnut, Air Pollution

Source: missouribotanicalgarden.org



Photo: UFEI

Ulmus parvifolia

Chinese Elm or Lace Bark Elm

Aki nire

Deciduous

Height: 40.00 to 50.00 feet

Spread: 25.00 to 40.00 feet

Bloom Time: August to September

Bloom Description: Reddish-green

Sun: Full sun

Water: Medium

Maintenance: Medium

Suggested Use: Shade Tree, Street Tree

Flower: Insignificant

Tolerate: Drought, Clay Soil, Air Pollution

Source: missouribotanicalgarden.org



Photo: OMC Seeds

Ulmus americana "Valley Forge"

American Elm

Deciduous

Height: 60.00 to 80.00 feet

Spread: 40.00 to 70.00 feet

Bloom Time: March to April

Bloom Description: Reddish-green

Sun: Full sun

Water: Medium

Maintenance: Medium

Suggested Use: Shade Tree, Street Tree, Rain

Garden

Flower: Insignificant

Tolerate: Drought, Black Walnut, Air Pollution

Other: This cultivar is showing resistance to Dutch

Elm disease

Source: missouribotanicalgarden.org



Photo: treeflower.la.coocan.jp

Vaccinium bracteatum

Sea Bilberry

南烛 / Shashambo, sashibo-no-ku, wakuraha

Evergreen

Height: 3.00 feet

Width: 3.00 feet

Sun: Semi-shade to sun

Bloom: White

Bloom Time: June-July

Fruit: Edible

Other: Prefers moist soil

Source: pfaf.org, efloras.org



Photo: Go Botany

Vaccinium pallidum

Late Low Blueberry, Pale Low Blueberry

Leaf duration: the leaves drop off in winter (or they wither but persist on the plant)

Armature on plant: the plant does not have spines, prickles, or thorns

Leaf blade length: 30–50 mm

Leaf blade width: 15–35 mm

Leaf stalk: the leaves have leaf stalks

Fruit type (general): the fruit is fleshy

Bark texture: the bark of an adult plant is thin and smooth

Twig winter color: brown, green, red

Bud scale number: there are three or more scales on the winter bud, and they overlap like shingles, with one edge covered and the other edge exposed

Source: Go Botany

This is native to Indiana and is used in Japanese gardens, therefore, no substitution is needed.



Photo: Butterfly Gardens to Go

Viburnum dentatum
Japanese Bush Cranberry

Gamazumi, yosozome, yotsuzumi

Deciduous

Height: 6.00 to 10.00 feet

Spread: 6.00 to 10.00 feet

Bloom Time: May to June

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Hedge

Flower: Showy

Attracts: Birds, Butterflies

Fruit: Showy

Tolerate: Clay Soil, Black Walnut

Source: missouribotanicalgarden.org



Photo: Wikimedia Commons

Weigela hortensis
Weigela

Tani ustsugi, beni utsugi

Deciduous

Height: 8.00 to 10.00 feet

Spread: 8.00 to 10.00 feet

Bloom Time: May to June

Bloom Description: Rose pink

Sun: Full sun

Water: Medium

Maintenance: Low

Suggested Use: Hedge

Flower: Showy

Attracts: Hummingbirds

Tolerate: Clay Soil

Source: missouribotanicalgarden.org



Photo: Crocus

Weigela florida
Weigela

Deciduous

Height: 6.00 to 10.00 feet

Spread: 9.00 to 12.00 feet

Bloom Time: April to June

Bloom Description: Rose pink

Sun: Full sun

Water: Medium

Maintenance: Low

Suggested Use: Hedge

Flower: Showy

Attracts: Hummingbirds

Tolerate: Clay Soil

Source: missouribotanicalgarden.org



Photo: UFEI

Zelkova serrata

Japanese Zelkova

Keyaki

Deciduous

Height: 50.00 to 80.00 feet

Spread: 50.00 to 80.00 feet

Bloom Time: March to April

Bloom Description: Green

Sun: Full sun

Water: Medium

Maintenance: Low

Suggested Use: Shade Tree, Street Tree

Flower: Insignificant

Leaf: Good Fall

Tolerate: Air Pollution

Source: missouribotanicalgarden.org



Photo: Wikipedia

Gymnocladus dioica

Kentucky Coffee Tree

Deciduous

Height: 60.00 to 80.00 feet

Spread: 40.00 to 55.00 feet

Bloom Time: May to June

Bloom Description: Greenish-white

Sun: Full sun

Water: Medium

Maintenance: Low

Suggested Use: Shade Tree, Rain Garden

Flower: Showy, Fragrant

Fruit: Showy

Other: Winter Interest

Tolerate: Drought, Air Pollution

Source: missouribotanicalgarden.org



Photo: World of Flowering Plants

Campsis grandiflora
Chinese Trumpet Creeper

Nōzen kazura

Height: 20.00 to 25.00 feet

Spread: 6.00 to 9.00 feet

Bloom Time: June to August

Bloom Description: Peach with yellow throat

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Flower: Showy

Attracts: Hummingbirds

Tolerate: Deer

Source: missouribotanicalgarden.org



Photo: Missouri Botanical Garden

Campsis radicans
Trumpet creeper

Deciduous

Height: 25.00 to 40.00 feet

Spread: 5.00 to 10.00 feet

Bloom Time: July

Bloom Description: Orange, scarlet

Sun: Full sun to part shade

Water: Medium

Maintenance: High

Suggested Use: Naturalize

Flower: Showy

Attracts: Hummingbirds

Tolerate: Deer, Drought, Clay Soil

Source: missouribotanicalgarden.org



Photo: eCommons @ Cornell

Clematis apiifolia
Celery-leaved Clematis

女萎 / Botan zuru

Deciduous

Height: 16.00 feet

Spread: 16.00 feet

Bloom Time September to October

Bloom Description: White

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Naturalize

Flower: Showy, Fragrant

Tolerate: Clay soil

Source: efloras.org, pfaf.org



Photo: Minnesota Wildflowers

Clematis virginiana
Woodbine

Height: 12.00 to 20.00 feet

Spread: 3.00 to 6.00 feet

Bloom Time: August to October

Bloom Description: White

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Naturalize

Flower: Showy, Fragrant

Tolerate: Deer, Black Walnut

Source: missouribotanicalgarden.org



Photo: Crocus

Euonymus fortunei

Dwarf Spindle or Climbing Spindle

Tsuru masaki, Ryūkyū masaki

Evergreen

Height: 0.50 to 0.75 feet

Spread: 1.00 to 3.00 feet

Bloom Time: April

Bloom Description: Greenish white

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Ground Cover, Naturalize

Flower: Insignificant

Leaf: Evergreen

Tolerate: Black Walnut

Source: missouribotanicalgarden.org



Photo: Go Botany

Parthenocissus quinquefolia

Virginia Creeper

Deciduous

Height: 30.00 to 50.00 feet

Spread: 5.00 to 10.00 feet

Bloom Time: May to August

Bloom Description: Greenish white

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Flower: Insignificant

Leaf: Good Fall

Attracts: Birds

Fruit: Showy

Tolerate: Deer, Drought, Heavy Shade, Erosion, Clay

Soil, Black Walnut

Source: missouribotanicalgarden.org



Photo: Lucid Key

Lonicera japonica
Japanese Honeysuckle

Suikazura, kinginka, nindō

Deciduous

Height: 15.00 to 30.00 feet

Spread: 3.00 to 6.00 feet

Bloom Time: June to October

Bloom Description: White maturing to yellow

Sun: Full sun to part shade

Water: Dry to medium

Maintenance: Medium

Suggested Use: Ground Cover

Flower: Showy, Fragrant

Attracts: Birds, Hummingbirds, Butterflies

Tolerate: Deer, Drought, Black Walnut

Source: missouribotanicalgarden.org



Photo: Go Botany

Lonicera sempervirens
Trumpet Honeysuckle

Deciduous

Height: 8.00 to 15.00 feet

Spread: 3.00 to 6.00 feet

Bloom Time: May to June

Bloom Description: Scarlet/orange with yellow inside

Sun: Full sun

Water: Medium

Maintenance: Low

Suggested Use: Naturalize

Flower: Showy

Attracts: Birds, Hummingbirds, Butterflies

Fruit: Showy

Tolerate: Deer, Clay Soil, Black Walnut

Source: missouribotanicalgarden.org



Photo: Kete New Plymouth

Parthenocissus tricuspidata

Japanese Creeper, Boston Ivy, Virginia Creeper

Natsu zuta

Deciduous (semi-evergreen in warmer climates)

Height: 30.00 to 50.00 feet

Spread: 5.00 to 10.00 feet

Bloom Time: June to July

Bloom Description: Greenish-white

Sun: Full sun to part shade

Water: Dry to medium

Maintenance: Low

Suggested Use: Ground Cover, Naturalize

Leaf: Good Fall

Tolerate: Deer, Drought, Heavy Shade, Erosion, Clay

Soil, Dry Soil, Shallow-Rocky Soil, Black Walnut

Source: missouribotanicalgarden.org



Photo: Go Botany

Parthenocissus quinquefolia

Virginia Creeper

Deciduous

Height: 30.00 to 50.00 feet

Spread: 5.00 to 10.00 feet

Bloom Time: May to August

Bloom Description: Greenish white

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Leaf: Good Fall

Attracts: Birds

Fruit: Showy

Tolerate: Deer, Drought, Heavy Shade, Erosion, Clay

Soil, Black Walnut

Source: missouribotanicalgarden.org



Photo: American Meadows

Actaea simplex
Bugbane

Sarashina shōma

Herbaceous Perennial

Height: 3.00 to 4.00 feet

Spread: 2.00 to 3.00 feet

Bloom Time: August to September

Bloom Description: White

Sun: Part shade to full shade

Water: Medium

Maintenance: Medium

Suggested Use: Naturalize

Flower: Showy

Source: missouribotanicalgarden.org



Photo: Native Wildflowers Nursery

Actaea pachypoda
White Baneberry

Herbaceous Perennial

Height: 1.50 to 2.50 feet

Spread: 2.00 to 3.00 feet

Bloom Time: May to June

Bloom Description: White

Sun: Part shade to full shade

Water: Medium

Maintenance: Low

Suggested Use: Naturalize

Flower: Showy, Fragrant

Fruit: Showy

Source: missouribotanicalgarden.org



Photo: Pinterest

Aquilegia flabellata
Japanese Columbine

Odamaki

Herbaceous Perennial

Height: 0.50 to 1.50 feet

Spread: 0.50 to 1.00 feet

Bloom Time: April to May

Bloom Description: Blue and white

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Flower: Showy, Good Cut

Attracts: Butterflies

Tolerate: Rabbit, Deer

Source: missouribotanicalgarden.org



Photo: Easy to Grow Bulbs

Aquilegia canadensis
Columbine

Herbaceous Perennial

Height: 2.00 to 3.00 feet

Spread: 1.00 to 1.50 feet

Bloom Time: April to May

Bloom Description: Light pink/yellow to blood
red/yellow

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Naturalize

Flower: Showy, good cut

Attracts: Hummingbirds

Tolerate: Rabbit, Deer, Drought, Dry Soil

Source: missouribotanicalgarden.org



Photo: Wikimedia Commons

Dianthus superbus var. *long calycinus* [sic]
Nadeshiko

Nadeshik or kawara nadeshiko

Herbaceous Perennial

Height: 1.50 to 2.00 feet

Spread: 1.50 to 2.00 feet

Bloom Time: June to July

Bloom Description: Crimson red to pink

Sun: Full sun

Water: Medium

Maintenance: Low

Flower: Showy, Fragrant

Tolerate: Deer

Source: missouribotanicalgarden.org



Photo: NC State

Dianthus armeria
Deptford Pink

Herbaceous Biennial

Height: 1.00 to 2.50 feet

Bloom Time: May to October

Bloom Description: Pink

Source: Missouri Plants, illinoiswildflowers.info



Photo: Amazon.com

Gentiana scabra var. *buergeri*
Buerger's Gentian

Rindō

Herbaceous Perennial

Bloom Time: August to November

Bloom Description: Blue

Source: plant-world-seeds.com

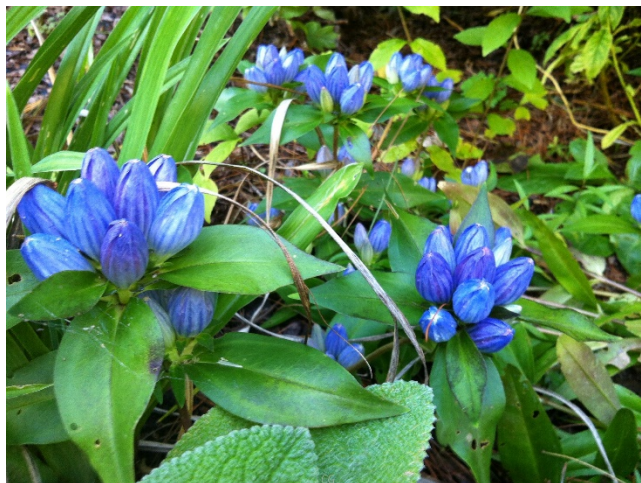


Photo: Garden Verve

Gentiana andrewsii

Closed Gentian

Herbaceous Perennial

Height: 1.00 to 2.00 feet

Spread: 1.00 to 1.50 feet

Bloom Time: October

Bloom Description: Dark blue

Sun: Part shade

Water: Medium

Maintenance: Low

Suggested Use: Naturalize

Flower: Showy

Tolerate: Deer, Clay Soil

Source: missouribotanicalgarden.org

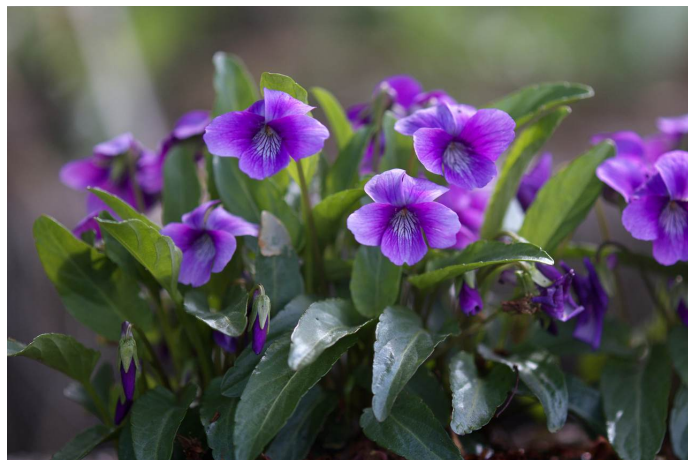


Photo: Wild Plants in and Around Shimane

Viola mandshurica
Manchurian Violet

スミレ / Sumire

Height: 8 inches

Bloom Time: August to September

Bloom Description: Purple

Sun: Semi-shade to sun

Water: Moist soil

Flower: Fragrant

Source: Wikipedia, pfaf.org



Photo: Jim Allison

Viola sororia
Common Blue Violet

Height: 0.50 to 0.75 feet

Spread: 0.50 to 0.75 feet

Bloom Time: April to August

Bloom Description: White, blue

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Ground Cover, Naturalize

Flower: Showy

Attracts: Butterflies

Tolerate: Deer, Clay Soil, Black Walnut

Source: missouribotanicalgarden.org



Photo: Gardenia.net

Carex oshimensis

Sedge

Ōshima kan suge

Type: Rush or Sedge

Height: 0.75 to 1.00 feet

Spread: 1.00 to 1.50 feet

Bloom Time: May

Bloom Description: Brown

Sun: Part shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Rain Garden

Flower: Insignificant

Leaf: Colorful

Tolerate: Deer

Source: missouribotanicalgarden.org



Photo: Tn Nursery

Carex pensylvanica

Sedge

Type: Rush or Sedge

Height: 0.50 to 1.00 feet

Spread: 0.50 to 1.00 feet

Bloom Time: May

Bloom Description: Greenish

Sun: Part shade to full shade

Water: Dry to medium

Maintenance: Low

Suggested Use: Ground Cover, Naturalize, Rain

Garden

Flower: Insignificant

Tolerate: Heavy Shade, Wet Soil

Source: missouribotanicalgarden.org



Photo: NC State

Native to Japan and North America.

Adiantum pedatum

Five-finger Fern, America Maidenhair Fern

Kujaku shida

Type: Fern

Zone: 3 to 8

Height: 1.00 to 2.50 feet

Spread: 1.00 to 1.50 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Part shade to full shade

Water: Medium

Maintenance: Low

Suggested Use: Naturalize

Tolerate: Heavy Shade

Source: missouribotanicalgarden.org



Photo: pfaf.org

Ardisia crisper
Christmas or Coral Berry

万両 / Kara-tachibana

Evergreen

Height: 3.00 to 10.00 feet

Width: 1.50 to 3.00 feet

Bloom Description: Clusters of small pinkish star-shaped flowers

Sun: Partial shade

Water: Well-drained soil

Maintenance: Low

Other: Red berries

Source: <https://www.rhs.org.uk/Plants/30319/Ardisia-crispa/Details>



Photo: Oregon State University

Ilex verticillata
Winterberry

Deciduous shrub

Height: 3.00 to 12.00 feet

Spread: 3.00 to 12.00 feet

Bloom Time: June to July

Bloom Description: Greenish-white

Sun: Full sun to part shade

Water: Medium to wet

Source: missouribotanicalgarden.org



Photo: Microscopy-UK

Pieris japonica 'Mountain Fire'

Mountain Fire Lily of the Valley or Japanese Pieris

馬酔木 / Asebi

Evergreen

Height: 9.00 to 12.00 feet

Spread: 6.00 to 8.00 feet

Bloom Time: April

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: High

Flower: Showy

Leaf: Evergreen

Tolerate: Deer, Heavy Shade

Source: missouribotanicalgarden.org



Photo: Go Botany

Vaccinium pallidum

Late Low Blueberry, Pale Low Blueberry

Leaf duration: the leaves drop off in winter (or they wither but persist on the plant)

Armature on plant: the plant does not have spines, prickles, or thorns

Leaf blade length: 30–50 mm

Leaf blade width: 15–35 mm

Leaf stalk: the leaves have leaf stalks

Fruit type (general): the fruit is fleshy

Bark texture: the bark of an adult plant is thin and smooth

Twig winter color: brown, green, red

Bud scale number: there are three or more scales on the winter bud, and they overlap like shingles, with one edge covered and the other edge exposed

Source: Go Botany



Photo: Oregon State University

Rhododendron keiskei 'Yaku Fairy'

Keisuki Rhododendron

日陰躑躅 / Hikagetsustuji

Evergreen Shrub

Height: 2.00 to 6.00 feet

Spread: Low-growing

Bloom Time: April

Bloom Description: Pale, dull yellow, bell-shaped, clustered

Leaf: Lanceolate to narrowly elliptic, 4-6cm long

Other: Often leggy

Source: Oregon State University, hirsutum.info, rhododendrons.co.uk



Photo: Wikipedia

Kalmia latifolia

Mountain Laurel

Evergreen Shrub

Height: 5.00 to 15.00 feet

Spread: 5.00 to 15.00 feet

Bloom Time: May

Bloom Description: Rose to white with purple markings

Sun: Part shade

Water: Medium

Maintenance: Medium

Flower: Showy

Tolerate: Rabbit, Deer

Source: missouribotanicalgarden.org

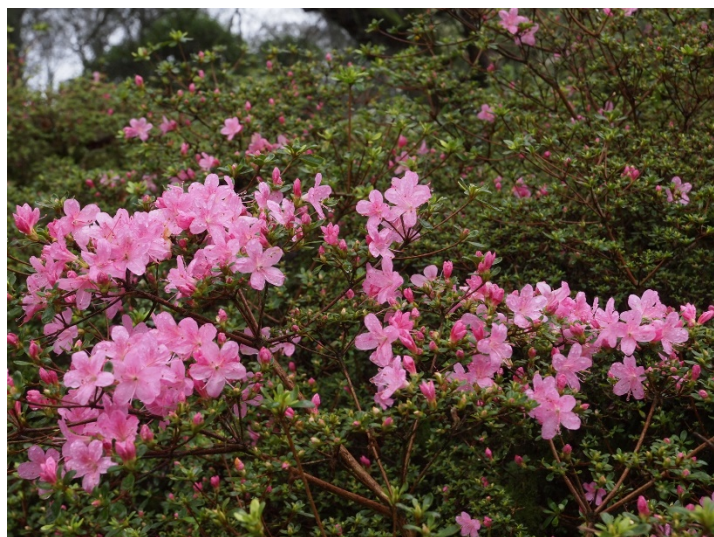


Photo: Caerhays Garden Diary

Rhododendron 'Hino Mayo'

Hinomayo Rhododendron

霧島躑躅 / Kirishimatsutsuji

Evergreen Shrub

Height: 1.50 to 3.00 feet

Spread: 1.50 to 3.00 feet

Bloom Description: Bright pink to red

Sun: Part shade

Water: Moist, well-drained soil

Maintenance: Low

Flower: Showy

Source: miwww.rhs.org.uk



Photo: Wikipedia

Kalmia latifolia

Mountain Laurel

Evergreen Shrub

Height: 5.00 to 15.00 feet

Spread: 5.00 to 15.00 feet

Bloom Time: May

Bloom Description: Rose to white with purple markings

Sun: Part shade

Water: Medium

Maintenance: Medium

Flower: Showy

Tolerate: Rabbit, Deer

Source: missouribotanicalgarden.org



Photo: Palma Verde

*Edgeworthia chrysantia**
Paperbush

三桠 / Mitsumata

Deciduous

Height: 4.00 to 6.00 feet

Spread: 4.00 to 6.00 feet

Bloom Time: February to April

Bloom Description: Yellow

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Flower: Showy

Other: Winter Interest, somewhat tropical

Source: missouribotanicalgarden.org



Photo: Gertens

Potentilla fruticosa
Potentilla or Cinquefoil

Deciduous

Zone: 3 to 7

Height: 2.00 to 4.00 feet

Spread: 3.00 to 5.00 feet

Bloom Time: June to September

Bloom Description: Yellow

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Flower: Showy

Attracts: Butterflies

Tolerate: Rabbit, Deer, Drought, Erosion, Clay Soil, Air

Pollution

Source: missouribotanicalgarden.org



Photo: Plant Explorer

*Spiraea cantoniensis**

Reeves Spirea

小手毬 / Kodemari

Deciduous

Height: 4.00 to 6.00 feet

Spread: 3.00 to 5.00 feet

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Flower: Showy

Other: Butterflies

Source: plants.ces.ncsu.edu



Photo: Proven Winners

Itea virginica

Virginia Sweetspire

Deciduous

Height: 3.00 to 5.00 feet

Spread: 3.00 to 5.00 feet

Bloom Time: June to July

Bloom Description: White

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Rain Garden

Flower: Showy, Fragrant

Leaf: Good Fall

Tolerate: Heavy Shade, Erosion, Clay Soil, Wet Soil

Source: missouribotanicalgarden.org

*Naturalized in Japan; native to China



Photo: Plants on Demand

Hibiscus syriacus 'Red Heart'

Rose of Sharon

木槿 / Mukuge

Deciduous

Height: 8.00 to 10.00 feet

Spread: 6.00 feet

Bloom Time: June to July

Bloom Description: White with red center

Sun: Full sun to part shade

Water: Medium

Suggested Use: Hedge, showcase, screen

Flower: Showy, Fragrant

Tolerate: Heavy Shade, Erosion, Clay Soil, Wet Soil

Source: Monrovia



Photo: Wikipedia

Kalmia latifolia

Mountain Laurel

Evergreen Shrub

Height: 5.00 to 15.00 feet

Spread: 5.00 to 15.00 feet

Bloom Time: May

Bloom Description: Rose to white with purple markings

Sun: Part shade

Water: Medium

Maintenance: Medium

Flower: Showy

Tolerate: Rabbit, Deer

Source: missouribotanicalgarden.org



Photo: Missouri Botanical Garden

Hydrangea paniculata
Panicle Hydrangea

糊空木 / Noriutsugi

Deciduous

Height: 8.00 to 15.00 feet

Spread: 6.00 to 12.00 feet

Bloom Time: July to September

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Hedge

Flower: Showy

Tolerate: Air Pollution

Source: missouribotanicalgarden.org



Photo: Missouri Botanical Garden

Hydrangea arborescens
Smooth Hydrangea

Deciduous

Height: 3.00 to 5.00 feet

Spread: 3.00 to 5.00 feet

Bloom Time: June to September

Bloom Description: White

Sun: Part shade

Water: Medium

Maintenance: Low

Suggested Use: Naturalize, Rain Garden

Flower: Showy

Tolerate: Rabbit, Erosion, Clay Soil, Dry Soil, Wet Soil,

Shallow-Rocky Soil, Black Walnut

Source: missouribotanicalgarden.org



Photo: Falling Water Designs

Patrinia scabiosifolia

Patrinia

女郎花 / Ominashi

Perennial

Height: 3.00 to 6.00 feet

Spread: 1.50 to 2.00 feet

Bloom Time: June to September

Bloom Description: Yellow

Sun: Full sun

Water: Medium

Maintenance: Low

Flower: Showy

Source: missouribotanicalgarden.org



Photo: Flickr

Zizia aurea

Golden Alexanders

Perennial

Height: 1.50 to 3.00 feet

Spread: 1.50 to 2.00 feet

Bloom Time: May to June

Bloom Description: Yellow

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Naturalize, Rain Garden

Flower: Showy, good cut

Attracts: Butterflies

Source: missouribotanicalgarden.org



Photo: Picssr

Aster ovatus var. *Microcephalus*
Honshu or Wild Aster

野紺菊 / Nokongiku

Perennial

Bloom Description: White to light purple

Source: no sources in English



Photo: gardenia.net

Symphyotrichum novae-angliae
New England Aster

Perennial

Height: 3.00 to 6.00 feet

Spread: 2.00 to 3.00 feet

Bloom Time: August to September

Bloom Description: Deep pink-purple

Sun: Full sun

Water: Medium

Maintenance: Medium

Suggested Use: Naturalize, Rain Garden

Flower: Showy, good cut

Attracts: Butterflies

Tolerate: Clay Soil

Source: missouribotanicalgarden.org



Photo: World of Flowering Plants

Aster tataricus
Tartarian Aster

紫苑 / Shion

Perennial

Height: 3.00 to 6.00 feet

Spread: 2.00 to 3.00 feet

Bloom Time: September

Bloom Description: Violet-blue with yellow center

Sun: Full sun

Water: Medium

Maintenance: Medium

Flower: Showy

Attracts: Butterflies

Source: missouribotanicalgarden.org



Photo: Flickr

Symphyotrichum patens
Spreading Aster

Perennial

Height: 2.00 to 3.00 feet

Spread: 1.50 to 2.00 feet

Bloom Time: August to October

Bloom Description: Blue to violet rays with yellow centers

Sun: Full sun to part shade

Water: Dry to medium

Maintenance: Low

Flower: Showy

Attracts: Butterflies

Tolerate: Drought, Dry Soil

Source: missouribotanicalgarden.org



Photo: Fine Gardening Magazine

*Campanula punctata**
Spotted Bellflower

螢袋 / Hotarubukuro

Perennial

Height: 1.00 to 2.00 feet

Spread: 1.00 to 1.50 feet

Bloom Time: June to August

Bloom Description: White to pale pink with purple
inside spotting

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Naturalize

Flower: Showy

Tolerate: Deer

Source: missouribotanicalgarden.org



Photo: St. Williams Nursery

Campanula americana
Tall Bellflower

Perennial

Height: 3.00 to 6.00 feet

Spread: 1.00 to 2.00 feet

Bloom Time: June to August

Bloom Description: Blue

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Annual, Naturalize

Flower: Showy

Source: missouribotanicalgarden.org

*Naturalized in Japan.



Photo: Plant Identification

*Chrysanthemum hybrids**

Mum

菊 / Kiku

Perennial

Height: 1.50 to 2.00 feet

Spread: 1.00 to 1.50 feet

Sun: Full sun

Water: Medium

Maintenance: Low

Suggested Use: Annual

Flower: Showy

Tolerate: Rabbit, Deer

Source: missouribotanicalgarden.org



Photo: Missouri Botanical Garden

Rudbeckia hirta

Black-eyed Susan

Perennial

Height: 2.00 to 3.00 feet

Spread: 1.00 to 2.00 feet

Bloom Time: June to September

Bloom Description: Yellow to orange-yellow rays and dark brown centers

Sun: Full sun

Water: Medium

Maintenance: Low

Suggested Use: Annual, Naturalize

Flower: Showy

Attracts: Butterflies

Tolerate: Deer, Drought, Clay Soil

Source: missouribotanicalgarden.org

*Naturalized in Japan.

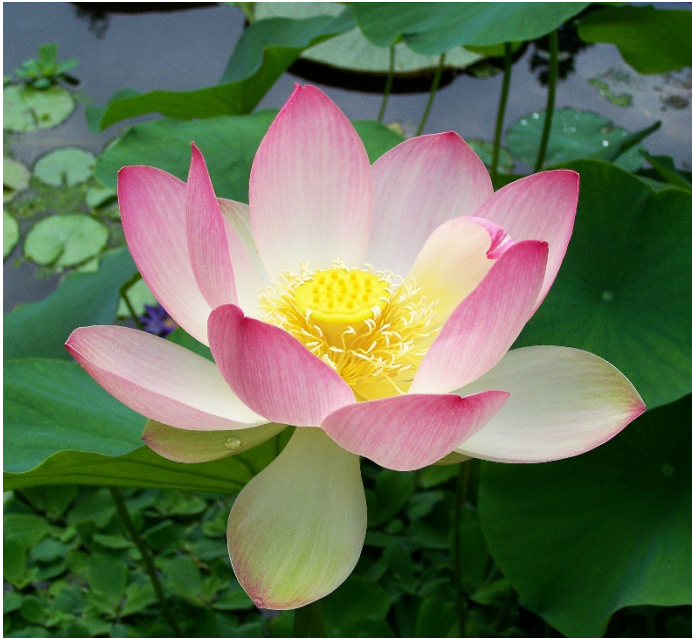


Photo: Wikipedia

*Nelumbo nucifera**
Sacred Lotus

蓮 \ Hasu

Perennial

Height: 3.00 to 6.00 feet

Spread: 3.00 to 4.00 feet

Bloom Time: June to July

Bloom Description: Pink or white

Sun: Full sun

Water: Wet

Maintenance: Low

Suggested Use: Annual, Water Plant, Naturalize, Rain
Garden

Flower: Showy, Fragrant

Source: missouribotanicalgarden.org

*Naturalized in Japan.



Photo: thismia.com

Nelumbo lutea
American Lotus

Perennial

Height: 3.00 to 6.00 feet

Spread: 3.00 to 4.00 feet

Bloom Time: June to July

Bloom Description: Pale yellow

Sun: Full sun

Water: Wet

Maintenance: Low

Suggested Use: Water Plant, Naturalize, Rain Garden

Flower: Showy, Fragrant

Source: missouribotanicalgarden.org



Photo: Wikipedia

Iris japonica

Japanese Iris

蓮 / Shaga

Perennial

Height: 0.75 to 1.00 feet

Spread: 1.00 to 1.50 feet

Bloom Time: May to June

Bloom Description: Pale blue to white with yellow crests

Sun: Part shade

Water: Medium

Maintenance: Medium

Suggested Use: Naturalize

Flower: Showy

Tolerate: Deer

Other: somewhat tropical

Source: missouribotanicalgarden.org



Photo: Far Reaches Farm

Iris cristata

Dwarf Crested Iris

Perennial

Height: 0.50 to 0.75 feet

Spread: 0.50 to 1.00 feet

Bloom Time: April

Bloom Description: Pale blue with gold-crested falls

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Ground Cover, Naturalize

Flower: Showy

Tolerate: Deer, Drought

Source: missouribotanicalgarden.org



Photo: Wikipedia

Iris sanguinea
Japanese Iris

菖蒲 / Ayame

Bulbous perennial

Height: 1.50 to 3.00 feet

Spread: 0.50 to 1.50 feet

Bloom Time: May to June

Bloom Description: Pale blue to white with yellow
crests

Sun: Full Sun to Partial shade

Water: Medium

Suggested Use:

Flower: Showy

Tolerate:

Other: Rhizomatous

Source: Wikipedia.org, www.rhs.org.uk



Photo: Lake Forest College

Iris versicolor
Blue Flag Iris

Perennial

Height: 2.00 to 2.50 feet

Spread: 2.00 to 2.50 feet

Bloom Time: May to June

Bloom Description: Violet blue

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Water Plant, Naturalize, Rain Garden

Flower: Showy

Tolerate: Deer, Wet Soil

Source: missouribotanicalgarden.org



Photo: Easy to Grow Bulbs

Lycoris radiata

Spider Lily

彼岸花 / Higanbana

Bulb

Height: 1.00 to 2.00 feet

Spread: 1.00 to 1.50 feet

Bloom Time: August to September

Bloom Description: Red

Sun: Full sun to part shade

Water: Medium

Maintenance: Medium

Suggested Use: Naturalize

Flower: Showy

Source: missouribotanicalgarden.org



Photo: NC State University

Lobelia cardinalis

Cardinal Flower

Perennial

Height: 2.00 to 4.00 feet

Spread: 1.00 to 2.00 feet

Bloom Time: July to September

Bloom Description: Scarlet red, white or rose

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Naturalize, Rain Garden

Flower: Showy

Attracts: Hummingbirds, Butterflies

Tolerate: Rabbit, Deer, Wet Soil

Other: only lasts a season or two

Source: missouribotanicalgarden.org



Photo: NC State University

*Kerria japonica**
Japanese Kerria

山吹 / Yamabuki

Deciduous

Height: 2.00 to 3.00 feet

Spread: 2.00 to 4.00 feet

Bloom Time: April to May

Bloom Description: Yellow

Sun: Part shade

Water: Medium

Maintenance: Medium

Suggested Use: Rain Garden

Flower: Showy

Leaf: Colorful

Tolerate: Deer, Drought, Heavy Shade, Clay Soil, Dry
Soil, Wet Soil

Source: missouribotanicalgarden.org

*Naturalized in Japan.



Photo: Gertens

Potentilla fruticosa
Potentilla or Cinquefoil

Deciduous

Zone: 3 to 7

Height: 2.00 to 4.00 feet

Spread: 3.00 to 5.00 feet

Bloom Time: June to September

Bloom Description: Yellow

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Flower: Showy

Attracts: Butterflies

Tolerate: Rabbit, Deer, Drought, Erosion, Clay Soil, Air
Pollution

Source: missouribotanicalgarden.org



Photo: Special Plants Nursery

*Anemone hupehensis**

Japanese Thimbleweed or Hubei Anemone

秋明菊 / Shumeigiku

Perennial

Height: 1.50 to 2.50 feet

Spread: 1.00 to 1.50 feet

Bloom Time: August to September

Bloom Description: White to pink

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Flower: Showy

Tolerate: Deer

Source: missouribotanicalgarden.org



Photo: Wikipedia

Anemone canadensis

Anemone

Windflower

Perennial

Height: 1.00 to 2.00 feet

Spread: 2.00 to 2.50 feet

Bloom Time: April to June

Bloom Description: White

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Naturalize

Flower: Showy, good cut

Tolerate: Deer, Clay Soil

Source: missouribotanicalgarden.org

*Naturalized in Japan.



Photo; Gardening on a Dime

Farfugium japonicum

Farfugium

石菖 / Tsuwabuki

Perennial

Zone: 7 to 10

Height: 1.00 to 2.00 feet

Spread: 1.00 to 2.00 feet

Bloom Time: September to October

Bloom Description: Yellow

Sun: Part shade to full shade

Water: Medium

Maintenance: Medium

Flower: Showy

Other: somewhat tropical

Source: missouribotanicalgarden.org



Photo: Monticello Shop

Asarum canadense

Wild Ginger or Snakeroot

Perennial

Height: 0.50 to 1.00 feet

Spread: 1.00 to 1.50 feet

Bloom Time: April to May

Bloom Description: Purplish brown

Sun: Part shade to full shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Ground Cover, Naturalize, Rain Garden

Flower: Insignificant

Tolerate: Deer, Heavy Shade, Erosion, Wet Soil

Source: missouribotanicalgarden.org



Photo: Plant Delights Nursery

Polygonatum odoratum
Solomon's Seal

甘野老 / Amadokoro

Perennial

Height: 2.00 to 3.00 feet

Spread: 0.75 to 1.00 feet

Bloom Time: April to May

Bloom Description: White

Sun: Part shade to full shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Naturalize, Rain Garden

Flower: Showy, Fragrant

Tolerate: Drought, Heavy Shade, Erosion, Dry Soil, Wet
Soil

Source: missouribotanicalgarden.org



Photo: Pinterest

Polygonatum biflorum
Smooth Solomon's Seal

Perennial

Height: 1.00 to 3.00 feet

Spread: 1.00 to 1.50 feet

Bloom Time: April to May

Bloom Description: Greenish white

Sun: Part shade to full shade

Water: Medium to wet

Maintenance: Low

Suggested Use: Naturalize, Rain Garden

Flower: Showy

Leaf: Good Fall

Tolerate: Erosion, Wet Soil

Source: missouribotanicalgarden.org



Photo: Oglesby Plants International

Miscanthus sinensis
Chinese Silver Grass

芒 / Susuki

Height: 4.00 to 7.00 feet

Spread: 3.00 to 6.00 feet

Bloom Time: August to February

Bloom Description: Copper maturing to silver

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Flower: Showy, Good Cut, Good Dried

Leaf: Colorful, Good Fall

Attracts: Birds

Other: Winter Interest

Tolerate: Drought, Erosion, Dry Soil, Black Walnut, Air

Pollution

Source: missouribotanicalgarden.org



Photo: Daisy's Visual Key

Sorghastrum nutans
Indian Grass

Grass

Height: 3.00 to 5.00 feet

Spread: 1.00 to 2.00 feet

Bloom Time: September to February

Bloom Description: Light brown with yellow
stamens

Sun: Full sun

Water: Dry to medium

Maintenance: Medium

Suggested Use: Naturalize

Flower: Good Dried

Leaf: Good Fall

Attracts: Birds

Other: Winter Interest

Tolerate: Drought, Erosion, Dry Soil, Shallow-Rocky

Soil, Black Walnut, Air Pollution

Source: missouribotanicalgarden.org



Photo: Arizona Aquatic Gardens

Equisetum hyemale
Scouringrush Horsetail

木賊 / Tokusa

Rush

Height: 2.00 to 4.00 feet

Spread: 1.00 to 6.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Medium

Suggested Use: Water Plant, Naturalize, Rain Garden

Flower: Insignificant

Tolerate: Heavy Shade

Source: missouribotanicalgarden.org



Photo: New England Wildflower Society

Equisetum laevigatum
Smooth Scouringrush or Horsetail

Rush

Height: 1.00 to 4.00 feet

Spread: Rhizomatous

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Full sun to part shade

Water: Medium to wet

Maintenance: Medium

Suggested Use: Water Plant, Naturalize, Rain

Garden

Flower: Insignificant

Tolerate: Sandy or gravelly soil

Source: Minnesota Wildflowers



Photo: Annie's Annuals and Perennials

Pollia japonica

East Asian Pollia

藪茗荷 / *Yabumyoga*

Perennial

Height: 1.00 to 3.00 feet

Spread: 1.00 to 3.00 feet

Bloom Time: July

Bloom Description: White

Sun: Part shade to full shade

Water: Medium to wet

Maintenance: Low

Flower: Showy

Fruit: Showy

Source: missouribotanicalgarden.org



Photo: Jersey-friendly Yards

Aronia melanocarpa

Black Chokeberry

Height: 3.00 to 6.00 feet

Spread: 3.00 to 6.00 feet

Bloom Time: May

Bloom Description: White

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Suggested Use: Hedge, Naturalize, Rain Garden

Flower: Showy

Leaf: Good Fall

Attracts: Birds

Fruit: Showy, Edible

Source: missouribotanicalgarden.org



Photo: White Flower Farm

Liriope muscari

Big Blue Lilyturf

藪蘭 / Yburan

Height: 1.00 to 1.50 feet

Spread: 0.75 to 1.00 feet

Bloom Time: August to September

Bloom Description: Lavender

Sun: Full sun to part shade

Water: Medium

Maintenance: Low

Tolerate: Rabbit, Deer, Drought, Erosion, Air Pollution

Source: missouribotanicalgarden.org



Photo: Missouri Plants

Verbena simplex

Narrow-leaved Vervain

Height: 0.75 to 2.50 feet

Spread: 0.75 to 1.00 feet

Bloom Time: Summer

Bloom Description: Lavender

Sun: Full sun

Water: Low

Source: illinoiswildflowers.info



Photo: AliExpress.com

Ophiopogon japonicus
Dwarf Lilyturf or Mondo Grass

蛇の鬚 / Jyano-hige

Perennial

Height: 0.25 to 0.25 feet

Spread: 0.25 to 1.00 feet

Bloom Time: June to July

Bloom Description: Lavender

Sun: Part shade to full shade

Water: Medium

Maintenance: Medium

Suggested Use: Ground Cover, Naturalize

Flower: Insignificant

Tolerate: Drought, Heavy Shade, Black Walnut

Other: somewhat tropical

Source: missouribotanicalgarden.org



Photo: Missouri Plants

Verbena simplex
Narrow-Leaved Vervain

Height: 0.75 to 2.50 feet

Spread: 0.75 to 1.00 feet

Bloom Time: Summer

Bloom Description: Lavender

Sun: Full sun

Water: Low

Source: illinoiswildflowers.info



Photo: inaturalist.org

Lepisorus thunbergianus
Weeping Fern

軒忍 / Nokishinobu

Fern

Height: 8"

Spread: 0-12"

Source: wildflower.org

No substitution.



Photo: Plants & Flowers

Cyrtomium falcatum
Japanese Holly Fern

鬼蕨蘇鉄 / Oniyabusotetsu

Fern

Height: 1.00 to 2.00 feet

Spread: 2.00 to 3.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Part shade to full shade

Water: Medium

Maintenance: Medium

Tolerate: Rabbit, Heavy Shade

Source: missouribotanicalgarden.org



Photo: Baker Environmental Nursery

Polystichum acrostichoides
Christmas Fern

Fern

Height: 1.00 to 2.00 feet

Spread: 1.00 to 2.00 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Part shade to full shade

Water: Dry to medium

Maintenance: Low

Leaf: Evergreen

Other: Winter Interest

Tolerate: Rabbit, Deer, Drought, Heavy Shade, Erosion,

Dry Soil, Shallow-Rocky Soil

Source: missouribotanicalgarden.org



Photo: Wikimedia Commons

Dryopteris erythrosora
Japanese Shield Fern

紅羊齒 / Benishida

Fern

Height: 1.50 to 2.50 feet

Spread: 1.50 to 2.50 feet

Bloom Time: Non-flowering

Bloom Description: Non-flowering

Sun: Part shade to full shade

Water: Medium

Maintenance: Low

Tolerate: Rabbit, Heavy Shade

Source: missouribotanicalgarden.org



Photo: Wikipedia

Matteuccia struthiopteris
Ostrich Fern

Fern

Height: 3.00 to 6.00 feet

Spread: 5.00 to 8.00 feet

Bloom Time: Non-flowering

Sun: Part shade to full shade

Water: Medium to wet

Maintenance: Medium

Suggested Use: Naturalize, Rain Garden

Tolerate: Rabbit, Heavy Shade, Erosion, Clay Soil,
Wet Soil

Source: missouribotanicalgarden.org



Photo: iNaturalist

Dicranum japonicum
Japanese or Broom Fork Moss

カモジゴケ / Shippogoke

Moss

Height: 2-8cm

No substitutions. Some sources say this plant is native to the Great Lakes region.



Photo: GardenPower

Leucobryum neilgherrense

Nilgiri Leucobryum

数葉苔 / Hosobaakinagoke

Moss

Height: up to 3cm

No substitutions.

No substitutions.



Photo: iNaturalist

Hypnum plumaeforme
Plumed Hypnum

這苔 / Haigoke

Moss



Photo: Mountain Moss

Polytrichum commune

Common Haircap or Great Golden Maidenhair

馬杉苔 / Umasugigoke

Moss

Height: 2 to 4", up to 12"

Other: very tall for a moss

Source: wikipedia.org



Photo: Alan Cressler

Sedum ternatum Michx.

Woodland Stonecrop, Wild Stonecrop

Perennial

Forb

Height: up to 12"

Width: spreading

Bloom Time: April-June

Bloom Description: White

Sun: Part shade

Water: Moist

Maintenance: Low

Tolerate: Thin, limey soils

Other: very tall for a moss

Source: wikipedia.org, wildflower.org,

indiana.plantatlas.usf.edu

No substitutions.



Photo: アクアフィールド

Pyrrhobryum dozyanum
Frans Dozy's Moss

桧苔 / Hinokigoke

Moss



Photo: Alexnid.com

No substitutions.

Leucobryum bowringii
Bowring's White Moss

粗葉白髮苔 / Aarahashiragagoke

Moss